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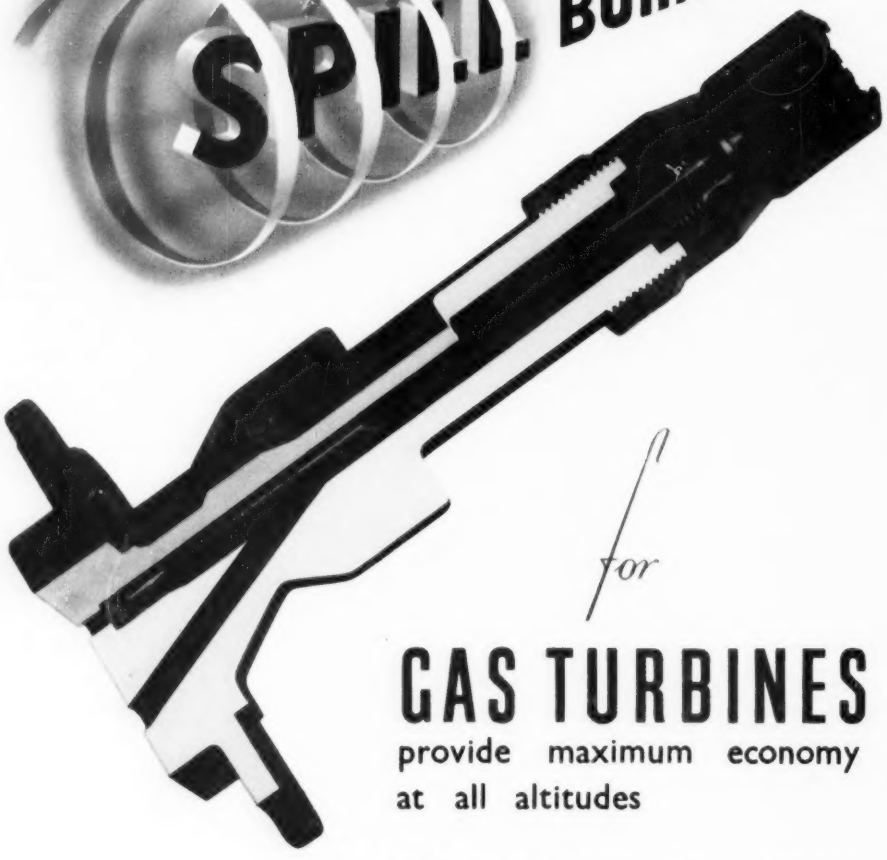

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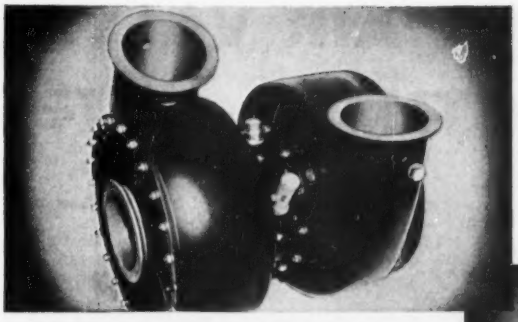

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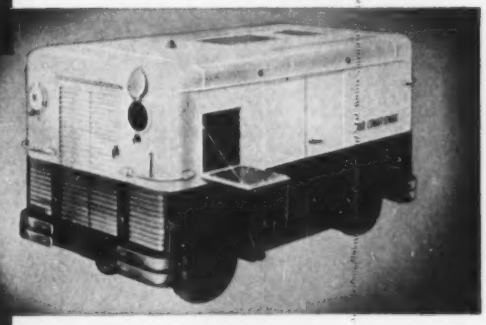

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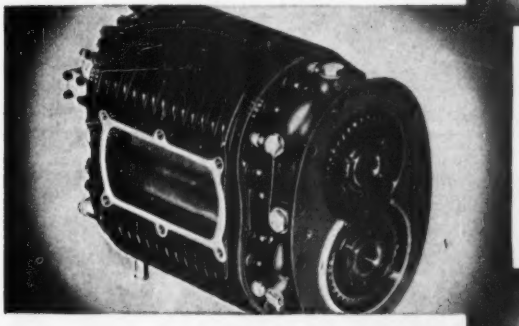

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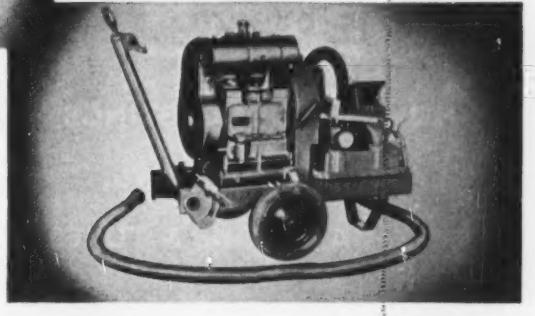

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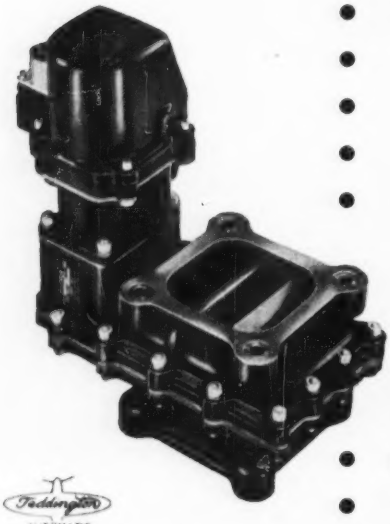

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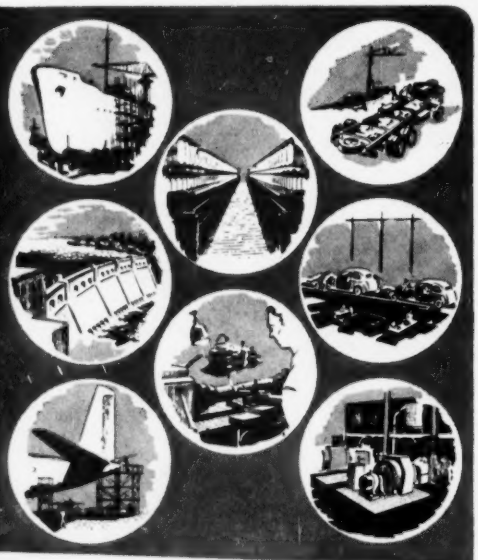

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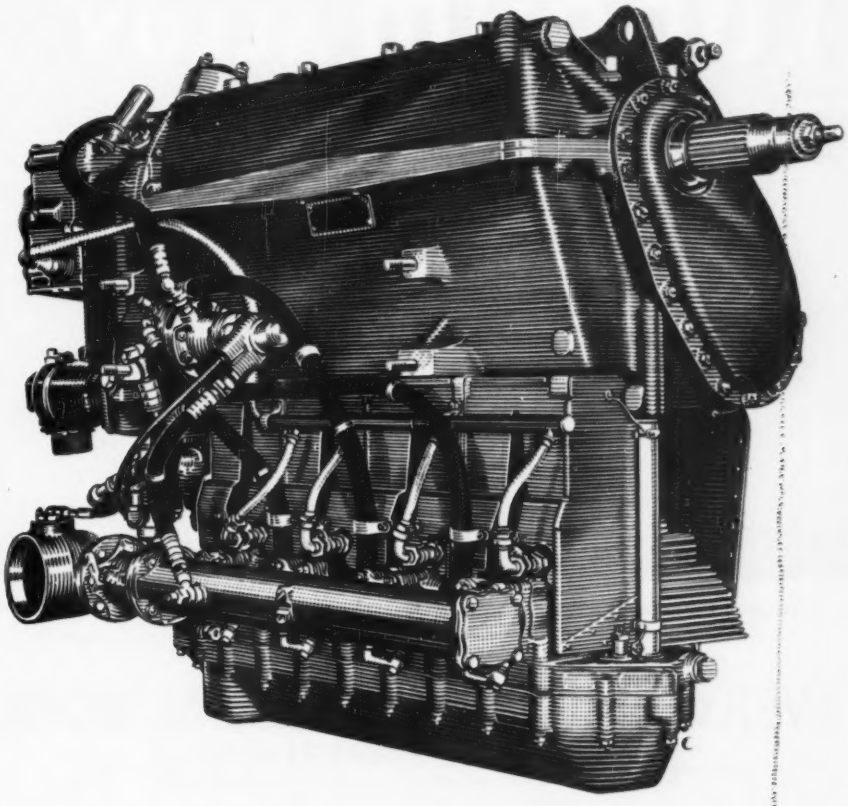

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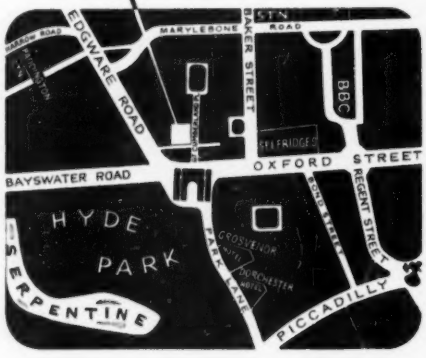

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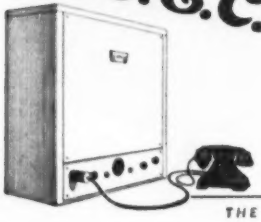

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Founded 1909

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Action Pending

THOUGHTS will already be turning to New Year resolutions when these words are read, and to our hopes for 1953. As individuals we shall no doubt resolve not to do various things, particularly of the kind which reflect unfavourably on our pockets. As a nation, too, our resolutions must be made with an eye on the Exchequer, but it is to be hoped that they will be of a positive nature—action to increase production and prosperity—rather than sterile cancellations and parings.

Paradoxically, almost everything concerned with aviation takes a long time—decisions regarding military and civil requirements; the placing of contracts; the design, production and development of the aircraft themselves and of their special equipment; the building of airports; and, of course, the training of pilots. It is thus all-important to foresee requirements and to make proper provisions well in advance. Considerable courage and confidence are often needed to initiate costly development programmes which cannot bear fruit for perhaps five years; but such decisions must be taken. We feel that it is much better to make an occasional mistake than to venture nothing.

It is only a week or two since production orders for military aircraft were cut in the national interest, and this has been accepted as a necessity, though a painful one in some cases. But development work in both the military and civil fields must continue, and, as we have observed, it is foresight together with design genius and production skill which in recent years have resulted in the introduction of three outstanding British airliners. This strong representation in their respective classes now helps to accentuate the absence in others—notably the lack of a medium-size commercial helicopter of the "Beabus" (or Dakota replacement) type. A requirement has been clearly indicated by B.E.A., and there is good reason to expect such a machine, when it becomes available, to create as great a demand as any of the turbine-powered, fixed-wing airliners which are now swelling our export accounts. Let one New Year resolution be to make sure that the helicopter development programme is well and truly launched.

For Immediate Action

But some non-technical matters demanding immediate action and calling for little courage or foresight also come to mind. For instance, 1953 will have been a good year if a practical non-political basis is found for the free expansion of British air commerce. Plenty of warnings have been given by eminent men that other countries will profit at our expense—they are doing so already—because of the prolonged political deliberations and half-hearted approach to the problems set by the combination of State-controlled and privately operated airlines.

The case of the Solent flying-boats, which for months past have lain deteriorating and idle, cocooned in non-protective red tape (and at the public expense) is surely one for quick solution. The British independent operators need long-range four-engined aircraft; air-trooping requirements are on the increase, and, we may add, not only have many families of Servicemen expressed a preference for air travel, but the few with experience of them prefer flying-boats to all else. With a reasonable guarantee of being allowed to compete for trooping contracts and other air services, more than one British operator would be able and willing to purchase and refit the Solents. Let's get them flying again without more delay.

In a paragraph above we have mentioned pilot training, and to this important subject we intend to refer in a subsequent issue. We put forward here for consideration the thought that only through the Services, or in a roundabout manner involving expense beyond the means of almost everyone, can a young man in this country hope to make commercial flying his career.

Perhaps it would not be inappropriate to conclude with an expression of appreciation for the various recent measures which help to make things easier for the flying clubs and their members. We refer, of course, to cadet-training schemes, air experience in club aircraft, three-year Cs. of A., and so on. These arrangements will undoubtedly pay dividends in national, practical air-mindedness in years to come.

THE FIFTIETH YEAR

—*of Heavier-than-air Flight: How the Wright Brothers made History*

By GEOFFREY DORMAN, A.R.Ae.S.

THE aeroplane as a practical flying machine has just entered its fiftieth year. On December 17th, 1953, there is to be a world-wide celebration of the Golden Jubilee of flying.

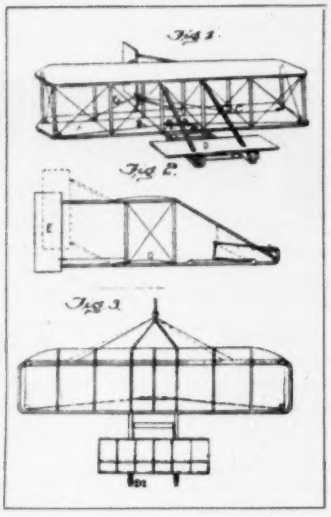
The United States will hold a celebration at Kitty Hawk, where a monument has been erected on the sand dunes to mark the spot where Wilbur and Orville Wright made the first successful power-driven controlled flight in history, on December 17th, 1903. In the United Kingdom the Royal Aeronautical Society are planning a representative dinner for the evening of December 17th, but it is not yet decided where it will be held. It is hoped that the replica of the first Wright "flyer" built by the de Havilland Technical School to replace the original, which was in the Science Museum, South Kensington, from 1928 to 1949—when it was restored to America—will be on view at the dinner.

The historic biplane was sent to England in 1928 because the Smithsonian Institute in Washington, where it is now exhibited, refused to acknowledge the Wrights' claim to having been the first to fly; they insisted that the honour should go to Prof. S. P. Langley, who was secretary of the Smithsonian. The Langley machine was wrecked while it was being launched over the Potomac River.

Rivals of the Wright brothers tried for many years to show that Langley's "aerodrome" (as he called it) was really the first practical flying-machine. In 1914, parties who were interested in proving that Langley would have predated the Wrights but for the launching accident, rebuilt the "aerodrome" and flights were made at Hammondsport under the auspices of that other great American pioneer Glenn Curtiss. Griffith Brewer of the Royal Aero Club, who was a close friend of the Wrights, went to America to investigate the Langley claims and found, beyond dispute, that a number of important modifications had been made to the "aerodrome"—including strengthening of the wings which had collapsed under load—without which it could not possibly have flown.

Those hostile to the Wrights persisted in supporting Langley's claim and when the Smithsonian authorities continued to claim success for Langley, Orville sent the flyer to London. In 1940 the Smithsonian authorities at last admitted that the Wrights were the first to fly so Orville Wright asked the South Kensington authorities to return the flyer to the Smithsonian when the war was over.

An exact replica of the biplane and its 12 h.p. engine was made by the D.H. students as an exercise, and is now in the National Aeronautical Collection at South Kensington.



The general-arrangement drawings from the Wright brothers' English patent No. 6732 of 1904.

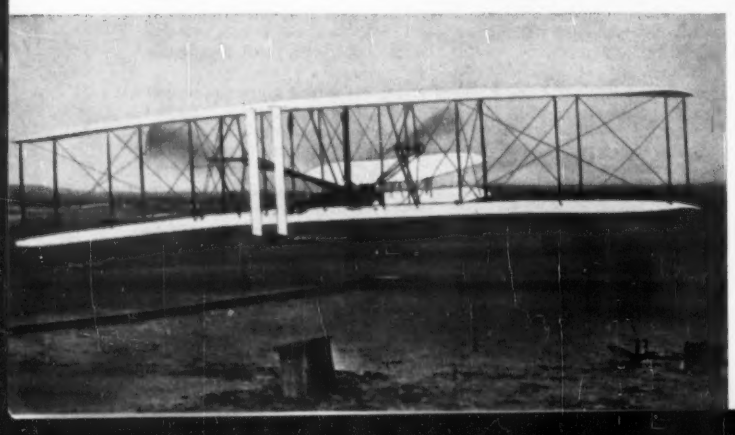
In 1903 the whole cost to the Wright brothers of building the flyer and its engine and transporting it about 700 miles from their home at Dayton, Ohio, to Kitty Hawk (an island of sand dunes a mile or so off the coast of North Carolina) was not more than 1,000 dollars, then equivalent to about £200. Wilbur, Orville, and their employee Charlie Taylor did all the work themselves; and, of course, the cost of materials was very much less then than it is now. I am told that if the building of the de Havilland Technical School's replica had been costed for materials and union-rate labour it would have amounted to something like £2,000—ten times as much as the original cost the Wrights.

This is surely proof that, in some respects, we make aviation far too difficult and complicated in these days. Wilbur and Orville Wright kept a small bicycle shop in Dayton where they made and repaired cycles, and Charlie Taylor was their mechanic. They built the flyer and its engine entirely as a spare-time job. Admittedly, their style was not cramped by official airworthiness regulations!

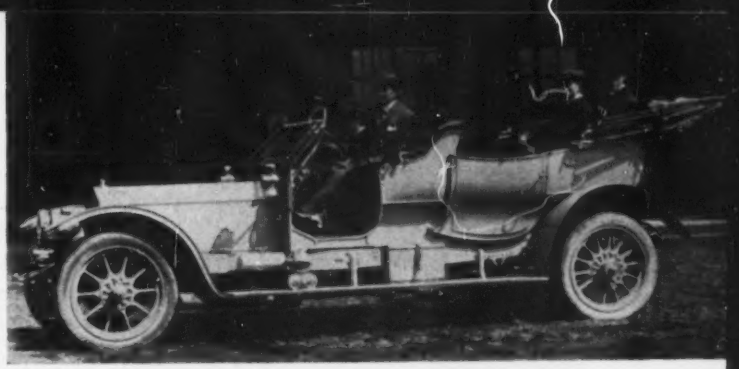
When the Wrights wrote to automobile makers to ask if an engine could be supplied, all the firms refused, for they felt it would harm their businesses if they were connected with madmen who thought they could fly. So the Wrights, who had already made a successful single-cylinder gas engine for their cycle shop, set to work and designed and built a four-cylinder engine which weighed, with all accessories, 170 lb; at 1,200 r.p.m. it gave 16 h.p. for fifteen seconds, and then it settled down to a steady 12 h.p.

They built a very crude wind-tunnel from a sugar box, and in this they tested wing-sections. Their greatest difficulty was with airscrews, for no data existed, and precious little had been published even about marine propellers. Eventually, after many months, they calculated that an airscrew turning at 305 r.p.m. would give 100 lb thrust. Their arithmetic was sound: in practice they found that 100 lb thrust was obtainable at 302 r.p.m.

The Wrights could give only two or three months each year to experiments at Kitty Hawk. They began in the late summer of 1900 with gliders, at first flown as kites to test controls. In 1901 and 1902 they made a number of free gliding flights; in September and October 1902 they made over a thousand



December 17th, 1903: Orville Wright takes off at Kill Devil Hill for the first controlled and sustained flight of 12 seconds.

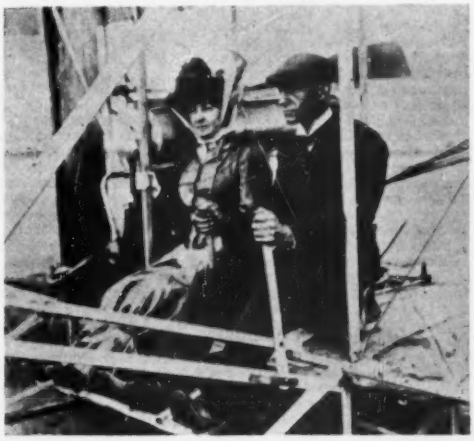


At Short Brothers' Shellbeach works in 1909. Orville Wright is in the front seat of the Rolls-Royce with the Hon. C. S. Rolls; Wilbur Wright is in the back with Griffith Brewer. Horace Short can be seen just beyond the steering wheel.
"Flight" photograph

glides, some of which exceeded two hundred yards. At the end of these experiments the brothers thought they had gained enough experience to justify fitting a motor that would make more extended flights possible.

By September 1903 the flyer was completed at Dayton and they set out with it to Kitty Hawk. They chose this site on the advice of the Weather Bureau as a place where steady winds blew. Fred C. Kelly, in his biography of the Wrights, said that neither brother had the slightest doubts that he would be successful in attaining his dream of controlled power-flight.

Fred Kelly described graphically the difficulties with bad weather, which blew down their shed, the lack of any real transport facilities, and the plagues of mosquitoes which had to be overcome. Parts of the flyer had to be sent back to Dayton for strengthening, with the result that the brothers were not ready to attempt flight until December.



The face of a pioneer: This excellent photograph of Wilbur Wright was taken at Le Mans on October 7th, 1908, when he conferred upon Mrs. Hart O. Berg the honour of being the first woman to fly in a heavier-than-air machine. The flight was short: it lasted 2 min 3 sec.

Wilbur and Orville tossed a coin for the honour of making the first attempt. Wilbur won. Rain and snow delayed the tests for several days and on December 14th the wind dropped altogether. This was a disadvantage, as they had not enough power to rise from level ground with no wind at all; so they took the machine to Kill Devil Hill, a quarter of a mile away (they had to drag it there) so that they could get a better start by running down the hill on the mono-rail track they had made for launching. Wilbur tried a flight, but stalled; the flyer was slightly damaged and was not ready for a further attempt at flight until just before dark on the 16th.

The next day—that historic December 17th, 1903—there was ice on the puddles and a wind blowing at between 22 and 27 m.p.h. But the Wrights wanted to get home for Christmas, so they decided to try.

It was now Orville's turn. He said, ten years later, that with the experience gained in hundreds of subsequent flights he would not dream of making a first flight in a strange machine in such a high wind. Starting from level ground Orville made a flight of 12 seconds' duration—the first sustained flight in history, under control, and ending with a landing on the same level as the start.

Wilbur then made a flight of 13 seconds and then Orville flew for 15 seconds. Wilbur made the last trip of the day, a real flight lasting 59 seconds. After he had landed and the flyer had been brought back to the starting point the wind was so strong that the machine was blown over and damaged; and that was the end of flying for 1903.

From that shaky start have come scores of types of airliners which carry passengers in comfort and safety all over the world; particularly the Comets, which carry people eight miles above the earth's surface at 500 m.p.h.; and military machines which fly faster than sound.

And all of this in the short span of forty-nine years. It may be that the Golden Jubilee next year will be celebrated by a flight to America from the United Kingdom by a B.O.A.C. Comet 2. What a worthy recognition if the Corportation were to call it the *Jubilee Flyer* in commemoration of that first "flyer" from which all modern aircraft have descended!

VALIANT AND CANBERRAS IN N.Z. RACE

IN the House of Lords on Wednesday of last week, Lord Gifford asked the Government if any further statement could be made about the participation of the R.A.F. in the London to New Zealand Air Race.

Lord De L'Isle and Dudley, Secretary of State for Air, replied that it was intended to enter a Valiant and one or more Canberras. He was sure the House would join with him in wishing success to these entries.

AVON LICENCE FOR SWEDEN

THE first manufacturing licence for the Rolls-Royce Avon axial turbojet to be accorded a country outside the British Commonwealth has been granted. Signatory for the Royal Swedish Air Board was Major-General B. M. Jacobsson, O.B.E., chief of the Air Board; Lord Hives, C.H., M.B.E., Rolls-Royce chairman and joint managing director, signed on behalf of his company. To meet initial requirements a number of complete Avons will be exported and, pending establishment of manufacturing facilities at Svenska Flygmotor A.B., a quantity of components will also be supplied. It will be recalled that the latest Swedish ground-attack prototype, the A-32 Lansen, is powered with an Avon.

BRITANNIA TROPHY PLAQUES

SINCE 1913 the Royal Aero Club has annually awarded the Britannia Trophy for the most meritorious performance by a British pilot during the previous year. It has now been decided to award commemorative plaques to those winners of the trophy who are still living; they number 18 in all, and of these 11 have so far accepted invitations to an R.Ae.C. house dinner on February 25th. Plaques are also to be sent to relatives of deceased winners.

Among the 18 are James Mollison, who received the award in recognition of his flight from England to Brazil, in a de Havilland Puss Moth, in 1933; Alex Henshaw, who, in 1939, flew a Percival Mew Gull from London to Cape Town and back (he made the 6,000-mile outward journey in 39 hr 25 min and returned, after a day's rest, in 39 hr 36 min); and Sir Alan Cobham. The last-named will qualify for three plaques: he received the trophy for his 12,000-mile survey flight across Europe and the Middle East, in a D.H.9C, in 1923; for his flight to Rangoon and back in a D.H.50, with Sir Sefton Brancker, in 1924-25; and again in 1926, following his D.H.50 seaplane survey flight to Australia and back.

The Britannia Trophy was presented to the R.Ae.C. in 1912 by Horatio Barber, who constructed and flew numerous aircraft. In 1911 he flew a total of 6,718 miles and carried, altogether, 151 passengers—exceptional figures in those days.

FROM ALL QUARTERS

American Sapphire Production

HUNDREDS of Armstrong Siddeley Sapphire turbojets, built under licence by the Curtiss-Wright Aircraft Company and the Buick Division of the General Motors Corporation, should be delivered within the next six months, according to Mr. Roswell Gilpatric, Under-Secretary of the U.S. Air Force.

Mr. Gilpatric defended the Sapphire against recent criticisms in the American Press, and said that it had successfully passed the rigid 150-hr model test which the U.S. Air Force imposes on all new engines before releasing them for mass production. He added that the Air Force was extremely optimistic concerning the future of the engine as a result of its excellent performance in recent flight tests in the first Republic F-84F Thunderstreak.

Gannets in the House Again

IN the House of Commons on December 17th, Mr. J. P. L. Thomas, First Lord of the Admiralty, was subjected to unusually stiff interrogation when Mr. J. A. Langford-Holt (Con., Shrewsbury) asked when the Staff requirement for the Gannet was first issued; why this requirement was subsequently altered; and what was the estimated lapse of time between this first Staff requirement and the equipping of the first Fleet Air Arm squadron with this aircraft. (The questioner's use of the earlier term for Naval Aviation gave rise, later, to a discussion on the merits of the two titles.)

Mr. Thomas replied that the original conception of the aircraft now known as the Gannet—not then intended for a primarily anti-submarine rôle—was the subject of a Staff requirement issued in December 1945. This requirement was later altered to make an anti-submarine rôle the primary purpose, and to enable the aircraft to carry a third crew-member and newly developed weapons and equipment. This altered final requirement was issued in January 1951. He regretted it would not be in the public interest to answer the last part of the question.

Mr. Langford-Holt commented that these alterations were of a type not limited to Gannets. The long production-delays which occurred were a great source of disappointment to those who had to fly the aircraft.

Mr. Thomas said that if the questioner would give him particulars of the other cases he had in mind he would gladly look into them. He gave an assurance that the Admiralty were in constant touch with the Ministry of Supply to avoid unnecessary delay which, in the case of the Gannet, was due to a change of policy regarding its rôle.

Capt. R. E. D. Ryder, V.C. (Con., Merton and Morden), said the Admiralty had in fact a very bad reputation on the whole question of aircraft production, and this impression was not being allayed by the latest reports in regard to the very latest aircraft. He asked Mr. Thomas seriously to examine a matter which was causing grave misgivings.

Mr. Thomas said he could not accept these strictures; but he could assure Capt. Ryder that, so far as the delay was concerned with general policy, the Admiralty were in constant touch with the Ministry of Supply.

Mr. Langford-Holt wondered if Mr. Thomas could not really look at this matter again and consider some new effort to put right something which was undoubtedly wrong at present.

Mr. Thomas then admitted that there had been "difficulties in the past." He maintained that every possible step between the two Departments was being taken to try to see that such delays did not occur again.

B.E.A. Plan Ahead

WRITING in the *B.E.A. Magazine*, Mr. Peter Masefield states that, provided currency restrictions do not cut foreign travel too stringently, the European tourist fares which are to be introduced on April 1st next year, should increase air traffic substantially.

"With our new aircraft," he says, "I am sure that we shall get a useful proportion of such an increase." As a result of the I.A.T.A. Traffic Conference decision, B.E.A. will offer three distinct types of service next year: (1) Silver Wing luxury services to Paris, Geneva, Zurich, Nice and other places where "a demand exists for the best that can be provided for a first-class fare." (2) Tourist services at much lower fares on all Silver Wing routes, domestic services and in Germany. Coffee, tea, sandwiches and biscuits will be served free and passengers will be able to buy lunch boxes in the departure lounges. (3) Standard services at fares comparable with tourist rates, with the same reduced baggage allowance, but providing free meals. These services will be operated chiefly on those routes where the Silver Wing/tourist combination does not apply, such as those to Scandinavia, Spain, Malta and east of Rome.

Mr. Masefield also announces some results for the first four weeks of the London-Scotland cheap fares—"a resounding success." Between October 26th and November 23rd, 7,010 passengers were carried between London and Scotland, compared with 2,620 in the same period last year—increasing revenue from £16,500 to £36,000 and improving the surplus over direct costs by over £8,500 (despite the increase in fuel tax, which takes the fares of "the first six passengers into each aeroplane").

Between December 19th and Christmas Eve the Corporation expect to carry a record number of Christmas passengers; there are 103 extra flights from London alone, and 32 more from points in the B.E.A. network.

First Comet for Export

AN independent airline, Union Aéromaritime de Transport, is the first overseas operator to take delivery of a de Havilland Comet. The first of the company's three Series IAs was ferried from Hatfield to Le Bourget by a U.A.T. crew, accompanied by M. Vidal, the company's president, D.H. service personnel, on December 17th.

The company, which operates long-haul routes from Paris to Africa and Indo-China, was recently reported to have taken up an option on two Series 2 Comets.

FRENCH COMET: As reported above, the first Comet for a foreign operator—Union Aeromaritime de Transport—was delivered last week. The aircraft is pictured (above) during crew-training at Hatfield before delivery; ferry pilots (left) were Capt. M. L. Loubry, manager of U.A.T., and J. P. Villaceque (co-pilot).

Blackburn Beverley

IT is announced that the official designation of the Blackburn and General Aircraft Universal Transport Mk II, powered with four Bristol Centaurus engines, is Beverley C. Mk 1. This accords with current practice in the naming of British military transport aircraft after towns and cities (e.g., York, Hastings, Valetta). Beverley, an English municipal borough, is the county town of the East Riding of Yorkshire. It is famed for its Gothic minster.

The Sea Dart

NOW named as above, the Convair XF2Y-1 delta-wing twin-jet fighter flying-boat has undergone initial taxying trials in San Diego Bay, California. The Sea Dart is equipped with retractable hydro-skis, as described in *Flight* of December 5th. It is the second type of jet fighter flying-boat to be built, the first having been the Saunders-Roe S.R./A.1, which took the air for the first time as long ago as July 16th, 1947.

New Use for Decca

THE use of the Decca Navigator as a measuring system in take-off tests of the Saunders-Roe Princess is now under consideration. The usual photographic method, in which two cameras operate as synchronized photo-theodolites and follow the aircraft throughout its run, is, of course, dependent on good visibility, and makes considerable demands on manpower and organization.

Already S/L. J. S. Booth, Saunders-Roe assistant test-pilot, has made some experimental runs in a Sunderland using the English Decca chain. The Decometers and a clock were photographed continuously by a ciné-camera, the clock being synchronized with the timed visual observations ashore, so that the two methods could be directly compared.

Capital for Super-priority

UNDERSTANDABLY in present circumstances, there is a marked tendency for the larger units of the British aircraft industry to seek additional working capital. This is a situation very little affected by the recent defence cuts, which are to fall mainly upon aircraft types at present in service. The Government has announced its intention of pressing forward the production of "newer and still more advanced types," and it is super-priority orders of this kind that will demand heavy tooling-up.

Rolls-Royce have recently completed arrangements for raising an additional £2½m, and last week the board of Hawker Siddeley, in issuing their report and accounts, announced a meeting, to take place on January 7th, at which shareholders will be asked to approve an important proposal. Present limit to the Group's borrowing powers is £5m. It is suggested that a figure of £16m, approved by holders of 4 per cent Debentures last July, be related to the group as a whole and that the unrestricted borrowing powers of the subsidiaries be abrogated. There is to be a secondary limit of £10m in respect of permanent borrowings, which can be raised only by consent of the Preference shareholders.

The Group's profits (to July 31st) were £5,184,552, as against £4,216,835 for the previous year. Stock and work in progress have risen by nearly £8m to nearly £24½m, while cash balances have fallen from over £4m to £670,000; these figures are an illustration of the need for additional capital.

Also announced last week was the Bristol Aeroplane Company's intention to seek new capital. Following an Appeal Court decision in favour of the company over capitalization of reserves, it is proposed so to treat £1,980,000 of reserves and to issue 660,000 new 5 per cent £1 Cumulative Preference shares and 2,640,000 new Ordinary 10s shares (credited as fully paid in each case) to Ordinary stockholders, in the proportion of two Preference and eight Ordinary shares for every £10 of Ordinary stock. Additionally, it is proposed to increase the authorized capital to £8m, and the company are asking that borrowing powers (at present equivalent to the paid-up share capital) be increased to twice that amount.

Bristol Test-pilots

IT is announced by the Bristol Aeroplane Co., Ltd., that, in accordance with his own request, Mr. R. Ellison is to relinquish the position of assistant chief test pilot on December 31st. He will in future be engaged mainly on the testing of production aircraft, and W/C. W. F. Gibb, D.S.O., D.F.C., will take over the duties of assistant chief test pilot.

W/C. Gibb was born in 1919, educated at Clifton College and joined the Bristol engine division as an apprentice in 1937. In 1940 he went into the R.A.F., was commissioned in November of that year and in four years rose to the rank of wing commander, also becoming C.O. of No. 239 Squadron. His record—especially on night-fighter operations—was a distinguished one.

After the war he returned to Bristol, this time as a test pilot. In addition to routine test flying of Brigands and Freighters he has covered some 50,000 miles as pilot of Freighter aircraft making demonstration tours abroad. In 1949 he was appointed co-pilot to Mr. A. J. Pegg for the maiden flight of the Brabazon I and, when a reserve crew was trained, he became reserve captain.

When arrangements were made for Bristols to service all Canadair-built Sabre fighters operating with the R.C.A.F. in the United Kingdom, Mr. Gibb completed a conversion course at North Luffenham and has since been responsible for the flight-testing of Sabres handled at Filton.

In August, 1952, he piloted the Olympus-Canberra on its maiden flight and has since carried out a good deal of test and demonstration flying on this aircraft. He is now captain of the reserve flight-test crew for the Britannia. In some 4,000 hours' flying, he has handled 75 different types of aircraft.

W/C. W. F. Gibb.

Mr. R. Ellison.

Ronald Ellison, who is now 44 years of age, was educated at Bedford School and H.M.S. *Conway*. After three years in the Merchant Service, he was granted a short-service commission in the R.A.F. in April, 1929, eventually becoming an instructor. He joined the Bristol company in 1934 as an instructor in its flying school, and was later employed on engine development flight-testing.

On the outbreak of war, Mr. Ellison went over to the test-pilot staff and in 1941 was appointed chief production test pilot at the Weston-super-Mare shadow factory. Of the total of some 3,300 Beaufighters from Weston, Mr. Ellison flew exactly 1,800.

In 1945 he returned to Filton, alternating aircraft and engine flight-testing with a number of overseas trips. During a visit to New Zealand he flew the Type 170 on service in New Guinea, carrying supplies to the Bulolo goldfields under flying conditions which he described as the worst he has ever experienced. He has visited Pakistan three times and has been responsible for the training, both there and at Filton, of many of the pilots now flying the Type 170 Freighter with the R.P.A.F.

Mr. Ellison became assistant chief test pilot in June, 1949. His log-books show 7,300 hours' flying in 80 different types of aircraft.

All's Well . . .

PITHIVIERS, south of Paris, scene of the Airwork Hermes IV forced landing in July of this year, was recently revisited under happier circumstances.

At the time of the accident the inhabitants of this small country-town took the passengers—all military personnel—into their homes and fed and housed them, whilst the Mayor and local authorities did all and more than was necessary to help. Happily, they had no casualties to receive; the fact that the Hermes was fitted with rearward-facing seats was probably responsible for this fortunate outcome.

In recognition of these kindnesses, the managing director of Airwork, Ltd., Sir Archibald P. Hope, decided that the town should be presented with a silver cup for some sport, to be designated by the Mayor. The ceremony therefore took place on December 11th, when a party of about 20 people—including the original crew of the Hermes—left Blackbushe in a Viking and flew to Orly, whence they travelled by bus to Pithiviers.

The function was an enormous success and the entire local population turned out to welcome the aircraft. From the War Office came, among others, the Director of Movements, Maj. Gen. C. G. B. Greaves, and the Inspector of Trooping, Col. B. J. O. Burrows. The Air Ministry was represented by W/C. L. A. Wear. At Pithiviers the visitors were joined by the British Civil Air Attaché, Mr. R. Birkett, the Assistant Military Attaché, Maj. W. C. Morgan, and the Assistant Air Attaché, W/C. I. N McDougall.

To a speech by the Mayor, Mr. Loel Guinness (president of Airwork, Ltd.) responded in French; he then presented the cup.

As we recorded on December 19th, the pilot of the Hermes, Capt. R. C. O. Lovelock, has received the Queen's Commendation for Valuable Service in the Air in recognition of his action.

HERE AND THERE

The Duke and the R.Ae.C.

THE Royal Aero Club announces that H.R.H. The Duke of Edinburgh has graciously accepted honorary life membership.

Another Helicopter Rescue

THE last 14 of 37 American seamen who spent a night on the stern of a cargo steamer which broke in two after running ashore near Leghorn, Italy, were rescued by four helicopters from the U.S. aircraft carriers *Midway* and *Leyte*.

Dead Heat

IT was disclosed in Washington last week that a U.S. Navy rocket fired from the White Sands, New Mexico, proving ground had reached an altitude of 135 miles. This equals the "record" for single-stage rockets, achieved by a Martin Viking in August last year.

Westland Director Retires

IT is announced that Mr. Arthur Davenport, F.R.Ae.S., has resigned from the board of Westland Aircraft, Ltd. His services are being retained in a consultative capacity. Mr. Davenport, who is 61 years of age, was formerly the company's chief designer.

Tale of Heroism

ENTITLED "The Last Flight of Hastings TG.574," a grim yet inspiring story of exceptional literary merit appears in the Christmas number of *Blackwood's Magazine*. Clearly the work of a writer who has had access to official reports, it is a minute-by-minute account of the events leading up to a forced landing at Benina, North Africa, after an airscrew blade had come adrift and severed the rudder and elevator controls. For his courageous behaviour an R.A.F. medical officer who was on board was awarded the George Medal, and the crew-members received the King's Commendation for Valuable Service in the Air.

"I'm going through the salary revisions now."

ONE MAN'S MEAT . . . Swiss Aero Club member H. Geiger lands amid mountains from choice. He is here seen at the Italian-Swiss border post of Testa Grigia (11,500ft), where he put down with a passenger; in the background is the Matterhorn. On the same trip he made successful landings and take-offs on and from three glaciers. The aircraft is a Piper Cub.

"Western Zone Commander? The old story—two Migs jumped me."

False Alarm

A MODEL aeroplane recently struck the glass of an airfield fire-alarm at R.A.F. station Albaston, breaking it. Two fire engines from Derby, nearby, were quickly on the scene.

British Plastics Exhibition

THE 1953 British Plastics Exhibition at Olympia, London, originally fixed (before the Coronation date was known) to open on June 3rd, is now to begin on Monday, June 8th and remain open until Thursday, June 18th. The organizers (*British Plastics*, Dorset House, Stamford Street, London S.E.1) state that only a few stands, on the ground floor, remain vacant.

Tory Committees Elected

CONSERVATIVE Party House of Commons Committees recently elected include the following:—*Civil Aviation:* A. Cdre. A. V. Harvey (chairman) and the Hon. John Grimston and Dr. Reginald Bennett (hon. secs.). *Defence:* Capt. the Hon. Charles Waterhouse (chairman), Capt. R. E. D. Ryder, Brigadier O. L. Prior-Palmer and A. Cdre. A. V. Harvey (vice-chairman), Major Tufton Beamish and Lt.-Col. J. H. Harrison (hon. secs.). *Air Sub-Committee:* A. Cdre. A. V. Harvey (chairman), Dr. Reginald Bennett (hon. sec.). *Transport:* Viscount Hinchinbrooke (chairman), Mr. D. L. M. Renton (vice-chairman), Mr. Geoffrey Wilson and Mr. Patrick F. Maitland (hon. secs.).

New York Aero Show

THE Second International Aviation Trade Show is to be held at the Hotel Statler, New York, from June 9th to 11th, 1953. The organizers are Aircraft Trade Shows, Inc., Hotel McAlpin, Broadway and 34th Street, New York.

"Elizabethans"

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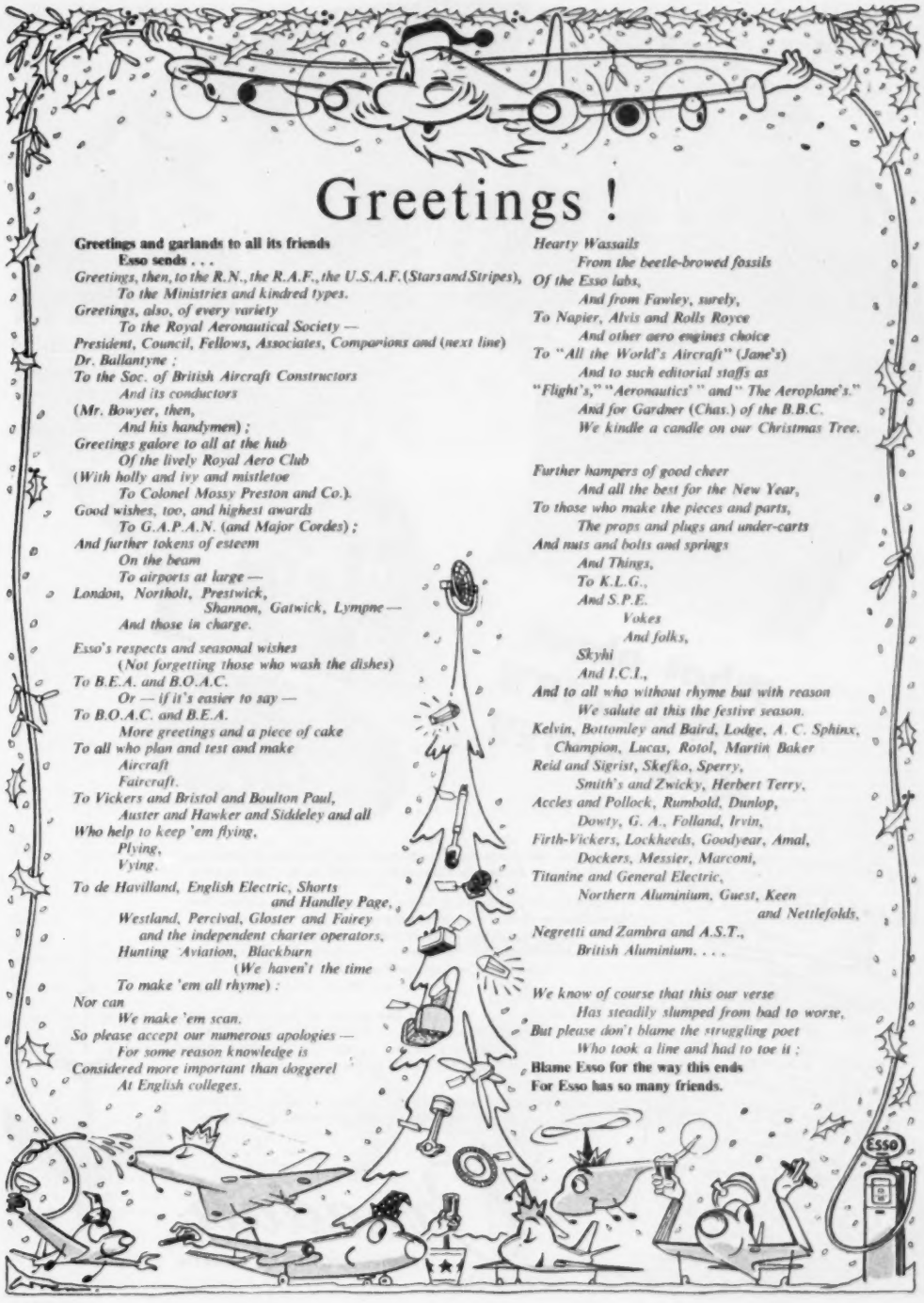
"All right, my navigation was at fault. So what?"



Greetings !

Greetings and garlands to all its friends
Esso sends . . .

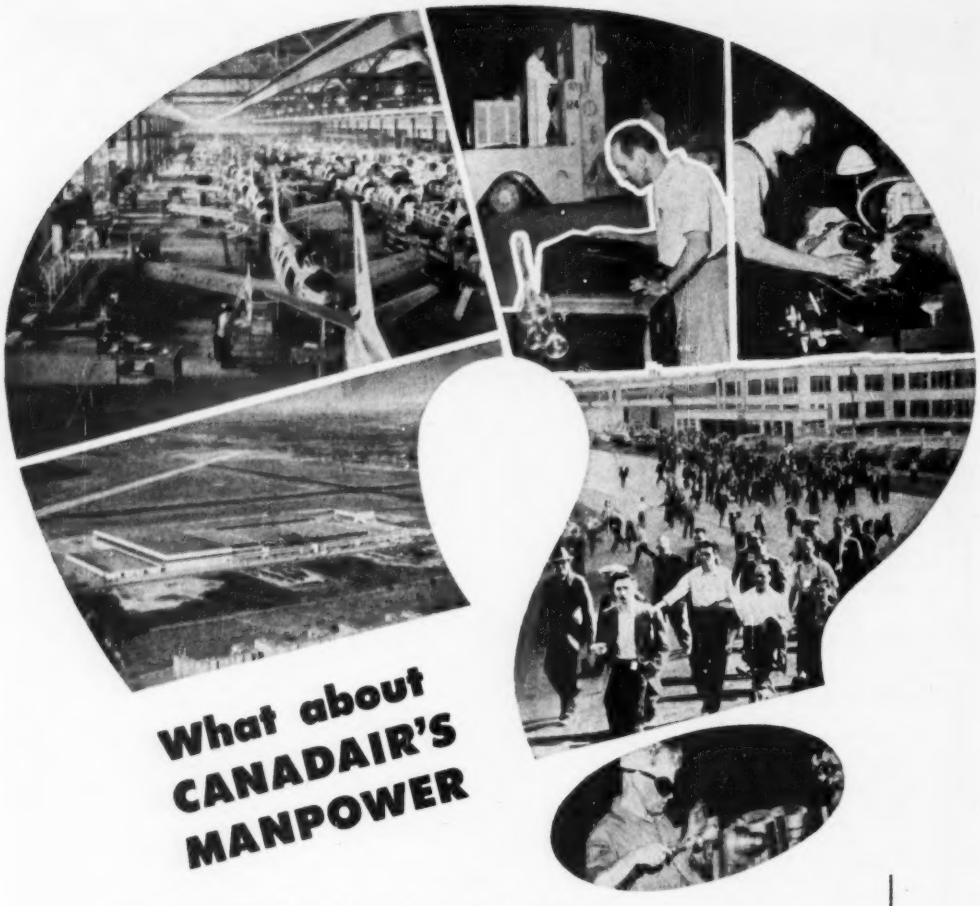
Greetings, then, to the R.N., the R.A.F., the U.S.A.F. (Stars and Stripes),
To the Ministries and kindred types.
Greetings, also, of every variety
To the Royal Aeronautical Society —
President, Council, Fellows, Associates, Companions and (next line)
Dr. Ballantyne ;
To the Soc. of British Aircraft Constructors
And its conductors
(Mr. Bowyer, then,
And his handymen) ;
Greetings galore to all at the hub
Of the lively Royal Aero Club
(With holly and ivy and mistletoe
To Colonel Mossy Preston and Co.).
Good wishes, too, and highest awards
To G.A.P.A.N. (and Major Cordes) ;
And further tokens of esteem
On the beam
To airports at large —
London, Northolt, Prestwick,
Shannon, Gatwick, Lympne —
And those in charge.

Esso's respects and seasonal wishes
(Not forgetting those who wash the dishes)
To B.E.A. and B.O.A.C.
Or — if it's easier to say —
To B.O.A.C. and B.E.A.
More greetings and a piece of cake
To all who plan and test and make
Aircraft
Faircraft.
To Vickers and Bristol and Boulton Paul,
Auster and Hawker and Siddeley and all
Who help to keep 'em flying,
Plying,
Vying.
To de Havilland, English Electric, Shorts
and Handley Page,
Westland, Percival, Gloster and Fairey
and the independent charter operators,
Hunting Aviation, Blackburn
(We haven't the time
To make 'em all rhyme) :
Nor can
We make 'em scan.
So please accept our numerous apologies —
For some reason knowledge is
Considered more important than doggerel
At English colleges.

Hearty Wassails
From the beetle-browed fossils
Of the Esso labs,
And from Fawley, surely,
To Napier, Alvis and Rolls Royce
And other aero engines choice
To "All the World's Aircraft" (Jane's)
And to such editorial staffs as
"Flight's," "Aeronautics" and "The Aeroplane's."
And for Gardner (Chas.) of the B.B.C.
We kindle a candle on our Christmas Tree.

Further hampers of good cheer
And all the best for the New Year,
To those who make the pieces and parts,
The props and plugs and under-carts
And nuts and bolts and springs
And Things,
To K.L.G.,
And S.P.E.
Vokes
And folks,
Skyhi
And I.C.I.,
And to all who without rhyme but with reason
We salute at this the festive season.
Kelvin, Bottomley and Baird, Lodge, A. C. Sphinx,
Champion, Lucas, Rotol, Martin Baker
Reid and Sigrist, Skefko, Sperry,
Smith's and Zwicky, Herbert Terry,
Accles and Pollock, Rumbold, Dunlop,
Dowty, G. A., Folland, Irvin,
Firth-Vickers, Lockheeds, Goodyear, Amal,
Dockers, Messier, Marconi,
Titanine and General Electric,
Northern Aluminium, Guest, Keen
and Nettlefolds,
Negretti and Zambra and A.S.T.,
British Aluminium. . . .

We know of course that this our verse
Has steadily slumped from bad to worse,
But please don't blame the struggling poet
Who took a line and had to toe it ;
Blame Esso for the way this ends
For Esso has so many friends.



What about CANADAIR'S MANPOWER

Vignettes of
CANADA — AIR LAND
Rather than wait for the spring break-up that would make navigation by water possible, the biggest airlift ever to operate over Canada's northland was recently organized.
The operation, extending about 700 miles over Canada's most rugged country, involved the air freighting of thousands of tons of bulky mining equipment to the Eldorado uranium mine on Bear Lake, and brought into service more planes than have ever flown on a supply mission in the north.
Today, Canada's leaders of industry no longer wait for such details as winter break-ups. As an air-minded nation Canada uses the air in the speedy development of her untapped natural resources.

The steady, reliable Canadian 'manpower pool' is without question one of the key factors in Canadair's ability to produce planes.

Canadair is fortunate in being located in an area abundant in skilled workmen . . . workmen who are strongly rooted in their traditions of home and province . . . intelligent, conscientious craftsmen . . . typical of the thousands who man the Canadair assembly lines *today*—and who will be on the job *tomorrow*.

Canadair has gained global recognition through its workers . . . through the honouring of delivery dates . . . through the building of aircraft rendering the maximum of service.

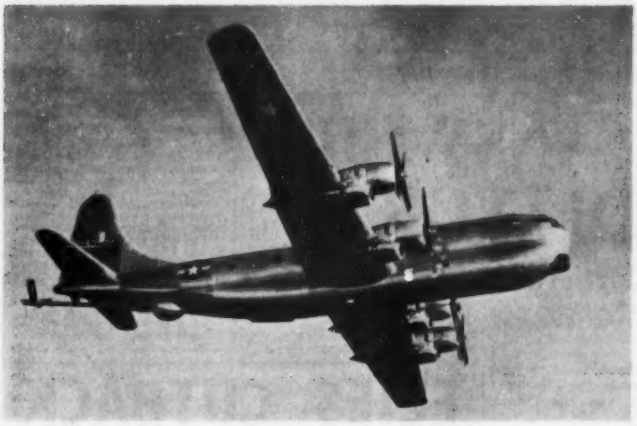
For further information: European Representative, J. H. Davis, Princes House, 190 Piccadilly, London, W.1, England.

Canadair

LIMITED, MONTREAL, CANADA

CAS2-15UK7

AIRCRAFT INTELLIGENCE



MULTI-PURPOSE aircraft of vastly different character are the new Boeing KC-97F (top) and the Matra-Cantinieau helicopter. In the picture of the big Boeing the flying-boom aerial refuelling "pod" is seen to advantage. This military Stratofreighter can be quickly converted from tanker to troop or cargo carrier, or ambulance. A note on the Matra-Cantinieau appears on this page.

U.S.A.

North American FJ-2. This carrier-borne development of the F-86 Sabre has a special nose oleo into which pressure is introduced to increase the length (and consequently increase the take-off incidence by 4 deg) for catapult launching. Two prototypes of the FJ-2 completed carrier-suitability trials aboard the U.S.S. *Midway* last August.

Republic XF-91. It has just been disclosed that this turbojet-cum-rocket experimental intercepter has accomplished supersonic flight. Of relatively old design, it features a variable-incidence wing with an inverse taper. No production order has been placed, but Mr. Mundy Peale, president of Republic, has said: "This is a combat-ready plane; it is not a purely research plane."

France

Morane-Saulnier 755. Following a fashion set by the Fouga concern, Morane-Saulnier are building their Type 755 military trainer, powered by two Turboméca Marbore II turbojets. This machine, which should fly in January, has side-by-side seats in a pressure cabin, and is equipped with two machine guns and a camera gun. Span and length, respectively, are 31.6ft and 31.7ft, and the gross weight is 5,950 lb. The estimated cruising speed is approximately 435 m.p.h.

Matra-Cantinieau Helicopter. This unusually interesting French helicopter, one of the first pictures of which appears here, weighs 880 lb empty and 1,325 lb loaded. The rotor diameter is 26.25ft. A French report ascribes to the new machine "oscillating hubs," and mentions "upper concentration of masses"; blades which "do not vary in pitch throughout their length and are of thin section"; and a "reduction in the amplitude of alternate movements in the control transmission." A total absence of vibration, a reduction in weight, low engine power and low production costs are claimed as advantages.

Payen Delta. This little research aircraft, a photograph of which appeared in *Flight* last week, is now known to be a scale model of a delta intercepter put up to the French Air Ministry in 1948 and designed for a speed of about 1,000 m.p.h. As we surmised, the turbojet is a Turboméca Palas. Construction is entirely of wood and the landing gear is of the single-main-wheel type. The little delta is said to have attracted the attention of the French Air Ministry and is to be tested in the large wind tunnel of O.N.E.R.A. (Office National d'Etudes et de Recherches Aeronautiques). The span is about 17ft, the gross weight some 1,000 lb, and the estimated max. speed, 310 m.p.h. Endurance is 1 hour.

Italy

Piaggio Developments. It is learned that the P-148 primary trainer is now being developed as a touring aircraft. A machine of this type, incidentally, was used last July to tow the Italian entrants from Florence to Madrid for the International Gliding Competitions in Spain. It is further reported that Piaggio have adapted one of their metal two-bladed constant-speed airscrews with a patented flexible coupling to absorb the vibrations of the Lycoming O-435-A.[1] The Piaggio company holds a licence to build the 240/260 h.p. GO-435-C2 as well as the 190 h.p. O-435-A.

XMAS SPECIAL EDN.

DAILY FLIGHT

The Unique Daily Paper, Published As and When!

No. 2 FRIDAY, DECEMBER 26, 1952 Page 1

BRITAIN ANSWERS BREADLINER

Sticklebacker Names Cornet, Discount, Filtonnia

("Daily Flight" Exclusive)

FIRST jetplane to fly in its own Mach cone is the Cornet. First dollar turboprofiteer is the Discount. First interhemispherical skycoach is the Fiscal Filtonnia.

With these crack skyliners Britain makes a triple bid for global jetmastery.

Spruce, willowy, ashen Captain Ned Sticklebacker, mouthpiece for Cistern Airlines' top brass, told a *Daily Flight* reporter in New York: "Nothing can lick the Cornet. That pure-jet, Limey flavour is tops. Smooth as a baby's nylons."

Describing as hollow mock-ups the Deadloss Breadliner and Groeing Stratodebt, Sticklebacker declared that Britain's Fiscal Filtonnia meant curtains for Blockspeed's Hyper-Consternation.

The turbopropinquity of the Discount spelt K.O. for the Cutfareliner, Sticklebacker added.

Interviewed in Marseilles, M. Juvenal de Linquent, Gallic, garlic President of CANASTA (*Compagnie Anonyme Nautique, Adrienne, Sousmarin, Terrestre et Astronautique*) hotly denied reports that the first of the new Beaverland jets for CANASTA would be named *Le Cornet à Pistons*.

In a Northern factory, it is currently believed, the lid will soon be lifted from another mammoth British jetliner—the Ashcan—containing top-secret by-products of a famous flying laboratory and of the R.A.F.'s latest atomic dispensary.

Hefty, hirsute, G. Forge Bedwards, Discount design and marketing boss, with a seat on the board of the vast Wickers-Armchairs combine, said of his brainchild, "This brainchild is no variant Valiant." Nevertheless, our American contemporary *Aviation Leak* declares that a forthcoming product of the same stable will be sharply swept.

Finally, *Daily Flight* is able to reveal that on the drawing boards where the monster Herpes IV was blueprinted is the most titanic leviathan of all these denizens of the stratospheric airlanes.

An H.P. source, quoted by Worcester, states that this double-banked, double-cranked colossus of the skyways will be Britain's answer to the secret American Breadliner. Its name, *Daily Flight* is privileged to reveal, is the Fredliner.

GREETINGS TO YOU!

Long shadows of the passing year pattern the sleeping earth in a filigree of seasonal splendour, turning our thoughts to the blessings of the family hearth, our eyes to the promise of a year unborn. With this mellow Yuletide vista, the Editor and staff of "Daily Flight" wish their readers, one and both, all seasonal joys by their flaming firesides.

STEPPE IN THE RIGHT DIRECTION

SIBERIA (Banish Airlines) now announce details of their forthcoming one-way luxury service, "The Commissar." Do not be misled by the Imperialist propaganda of rival airlines, whose cannibal mouthpieces admit that the downtrodden workers of the West must pay for tickets. Siberia know what is best for the passenger. Only Siberia can offer: *free* tickets, *compulsory* bookings, *undisclosed* destinations. Only Siberia offer the last word in airline comfort —the *Tashmaster*, powered by one-sided Kremlins working on the anti-reactionary principle.—Advt.

FLIES CUTBACK

Backroom Men Seek Payrise as Ace Pilot Probes Monster Jet

AFTER persistent setbacks, attributed to out-dated super-priority grading, the phenomenal Cutback, *Daily Flight* is able to disclose, is at last receding along an ever-contracting reduction line at a truly discouraging rate.

Unique among Britain's warplane crop, the trim Cutback has singeing speed, is causing warm discussion throughout the industry and R.A.F. Commands. Even now squadrons are being disbanded in preparation for Cutback deliveries.

Input is soaring as factories gear down to turn out the paper-dart warplanes. Man behind Cutback is ace designer Cleaver, Treasury's top tightfist.

The Cutback is Britain's second economy plane, Cleaver told a "Daily Flight" reporter. An earlier project, called Cutlet, after its designer Halfcut, was chopped when engineers found that beefed-up intake grills put on too much weight.

Magic Eye Gun

Behind news of the axing of the Cutback backlog is a story of steadfast reversal, culminating in the transference to a sister factory of the latest batch to be cancelled. In this top secret plant a special rear-vision canopy has been developed for the Cutback. The compressed-air system is being adapted for a b-suit installation, and a special laying-off device is coupled with the hush-hush radar gun-sight.

Now read how the Cutback handles in this exclusive *Daily Flight* report from redundant staff pilot M. Dorset-House.

Lower Budget, Wilts, Monday.—Make no mistake, the Cutback is a cut above the Cutlass. Its razor-edge wing gives it an edge on the Sabre. Apart from an unpredictable tendency to undamped pitching oscillation between subsonic Mach limitations (experts call this "flutter," will cure it by adding wetted area), the Cutback is easy to fly. Comfortably installed in the cane-backed injector seat, I tuned in to A.F.N. on the V.H.F. Then I lined up down-wind, cut the h.p. cock. As the Cutback decelerated down the runway I was captivated by the beauty of the rearward view.

Over Epsom

Once at operational height I found the Cutback stable and tried the stalls without delay. In cloud this prototype cuts no ice, so I was alarmed to feel the ailerons become solid. Of freeze type, they have set-back hinges with power feed-back and artificial reversal. For several minutes I wrestled with the controls, being in some doubt as to my attitude, but after operating the dive-discovery flaps, I sensed a sonic change. It was now possible to control the pitching with the aid of wires stretching from a "banjo" coupling. (Boffins call these g-strings, adjust them to obtain mean chord.)

With the "stick" still locked there was no alternative but to keep wrestling until the air thickened and a bell at the end of the Machmeter* told of return to subsonic speed. I broke cloud over the airfield with feet to spare.

Back at ground level the control feedback cut in again as the Cutback's engine cut out. To get out or cut fine the approach—that was the question. But the Cutback is not cut out for such capers; the engine cut in again and soon I skimmed in over the runway, operated the slatted flops and slewed to a standstill.

I have no doubt that all pilots will consider the Cutback fully justified.

**Named after Germany's Dr. Mach. He discovered sound.*

Test Pilot, Barred from Boss's Daughter—

SMASHED WINDOW WITH MYSTERY SKY BANG

—Court Story

A TEST pilot broke a window in his employer's house because he (the employer) had refused him his daughter's hand.

He did it by aiming a "supersonic bang" at the window.

This was the story told by the prosecution when Mark Haywire, 34, of Little Boosting, Beds, appeared before the local Bench on summonses for flying an aircraft to the public danger in contravention of the Air Navigation Order, 1949, or, alternatively, of causing an air disturbance, to wit, a loud bang, by which a breach of the peace might have been occasioned.

Mr. Harold Clampers, for the prosecution, said that defendant was employed as a test pilot at the aeroplane factory of which Sir Max Overdrive was chairman and managing director.

Left the House

On November 25th Haywire had called upon Sir Max at his home to make a private request. This, it was believed, concerned the possibility of his (Haywire's) marrying Sir Max's daughter.

Next morning a plane was seen diving through a sound barrier directly towards Overdrive Towers, Sir Max's residence.

"There was a loud bang, or detonation," said Mr. Clampers, "shortly followed by a second. The bathroom window in the east wing shivered into fragments."

Sir Max was in his bath, in that room, at the time.

The Chairman (Ald. Dimworthy): Was he shivering, too? (Loud laughter.)

Witness Rebuked

Several witnesses were then called, all of whom testified to hearing the explosions.

One, Peter Pedantica, of Cambridge, said he had taken particular note of them as he had been reading in a flying magazine a controversy over the cause of such sounds. "I listened carefully," he added, "because I wanted to write and tell the boffins—"

The Chairman: The *what*?

Witness: Boffins.

The Chairman: I will not have such language used in this court. Stand down.

Mr. Digit then quoted the view of a famous test pilot, recently given in a public speech, that "supersonic bangs" could not break windows, though they might make trouser-legs flap.

The Chairman: Did they make Sir Max's trouser-legs flap?

Mr. Digit: With great respect, he was wearing none. He was, as we have seen, in his bath.

Haywire, in the witness-box, denied all knowledge of any explosions. On the morning in question he was flying a 65 horse-power ultra-light plane, the slowest and most inefficient made by the factory—

At this point Sir Max Overdrive rose in the body of the court, to interject: "That is a most unfair and damaging observation."

In reply to Mr. Digit, defendant said that an ultra-light plane could not make a "supersonic bang."

The Chairman: Why not?

Haywire: Because it cannot reach supersonic speed.

The Chairman: And what, pray, is that?

Haywire: A speed greater than

TEST-PILOT HAYWIRE
Went bang.

the local speed of sound, having regard to temperature, humidity, pressure and—

The Chairman: Perhaps we need not pursue this point any further.

Mr. Clampers: How do you *know* this ultra-light plane cannot reach this special speed, whatever it is?

Haywire: Because it never has.

The Chairman: Not a very convincing answer. It might reach it, with the wind behind it, and going downhill.

After further evidence had been heard, including that of two men who had been blasting tree-stumps in the grounds of Overdrive Towers on the morning in question, the Magistrates retired to consider their verdict.

On their return, the Chairman announced that they found the case proved. There was, however, some doubt as to whether defendant knew the aeroplane to

Col. 3 ★

Felicity Furrow Tells You—

What Britain's Air Girls will be Wearing

SUMMONED urgently to London from his sumptuous gorgonzola-green and white-striped Paris *salon* yesterday was *couturier* Fustian Dear. He flew hot-foot ("Le chauffage d'avion etait trop fort"*) at the request of the two British airline companies.

They have decided that their many air stewardesses (or hostesses, as we sometimes hear them gaily called!) *must* have some clothes. Now, plans are going ahead like absolute mad!

♥ ♥ ♥

WHEN we asked M. Dear on what lines he was thinking, he didn't at first understand our "schoolgirl" French! But amply-equipped brunette Selena Scandle (remember? She obtained the most points of any hostess in the airlines' "Outstanding Features" scheme last year) was there as interpreter.

♥ ♥ ♥

M. DEAR said that a one-piece uniform had much to recommend it, but some of the airline executives had not accepted his suggested colour scheme. This was, he continued, simply "ravissante," and when we saw the patterns we *had* to agree.

The Arabian-nights-type trousers (which lead up to the blouse-top)—are *so* clever! and looked so right in Pionair Pink, with tiny pockets for those little oddments which the girls always seem to collect from some passengers.

And then the streamlined top in Shock-wave Cerise—well, we felt quite, quite certain it will be irresistible, and when the hostesses are actually *wearing* it, passenger statistics will show that this is really an air-male country!

FUSTIAN'S CREATION
No sackcloth or ashtrays.

* *"Maybe we turned the heat on," translated the airliner captain, winking at your correspondent.*

PLANE FARE

By "Daily Flight" Airline Correspondent

Last month, top airline bosses from 84 nations held high-level talks for 21 days in the penthouse of a plush hotel at Cannes (France).

What did they talk about? Delegates were cagey. Said Capt. Van Guff, famous K.K.L.L.M.M. pilot: "It was all double-Dutch to me."

Purpose of the meeting, I can reveal, was to speed up serving of meals aboard planes. This will eliminate what pilots call the "queue code."

Airlines have also decided to offer the same Christmas menu to all passengers. An official told me: "Fares have been standardized."

Goose will be served on all North Atlantic flights, with gander as an alternative. To ensure high load-factors, most airlines will also provide free drinks.

★ SKY BANG

be capable of producing the explosions. Sir Max, as the manufacturer of these machines, was himself to blame, in some measure, for not fitting them with more efficient silencers. In the circumstances, the Bench felt that a fine of 7s 6d would meet the case.

Haywire: Time to pay?

The Chairman: Certainly not.

STOP PRESS

CUTBACK (see p. 1)

Govt. today announced plans for civil version of Cutback. Bush transport variant, named Outback, scrubbed. Alternative project, Cutrate, designed for tourist travel. Sliderulers say Cutrate carries no passengers, always operates at 100 per cent load factor.

AIRCRAFT APPRENTICESHIP

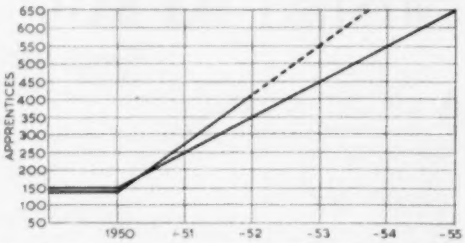
An Examination of the Facilities Offered by One of the Larger Aircraft Firms

THAT the aircraft industry is one of this country's most precious assets no one would today deny. But it is less frequently remembered that, like all other industries, it can flourish only when it is assured of a steady intake of properly trained technicians. With our very limited labour resources it is of paramount importance to ensure that this potential is attracted into the most useful channels at an early age. This could easily be done, of course, by direction of labour; but such practice is abhorrent in peace-time, and it is, therefore, essential for the industry to offer facilities for training and prospects of a lifetime of security in order that the right type of young man may feel disposed to join its ranks.

We have recently visited the Apprentice Training School of A. V. Roe and Co., Ltd., of Chadderton, near Manchester, with a view to determining what can be offered to prospective apprentices, the educational qualifications which are desired by the company, and the prospects for a man at the end of his training. We chose this school because it is a good one, and enjoys an unusually high reputation.

In 1945 the Avro school had an annual intake of about 30 apprentices, nine or ten of whom were "engineering" apprentices, and the remainder "trade" apprentices. For so big a firm, this was not an unduly large intake, particularly when it is remembered that all Manchester was available as a source of candidates. Even so, the company had difficulty in attracting sufficient boys of the right education and character. What was done to break this stalemate is worthy of some study.

In May, 1951, a very great expansion in the annual intake was scheduled, the increase to take effect forthwith. The proposed establishment was 100 trade and 30 engineering apprentices per year. At the same time, the qualifications required of candidates were considerably increased. The prospective trade apprentice was to be a boy of up to 16 years, with a secondary-modern technical education—of whom many were becoming available each year in Manchester. He was to undergo a selective examination and an interview before acceptance. The aircraft engineering apprentice could be aged up to 18½ with a grammar or public school education. If below the age of 17, he would be accepted with the General Certificate of Education (ordinary level), provided he could offer five subjects, including mathematics, English, and a science subject appropriate to engineering. If at the upper age limit of 18½, he was required to show pure or applied mathematics, physics, and chemistry, all at the advanced level. A decision on acceptance or rejection was then taken after a simple interview.



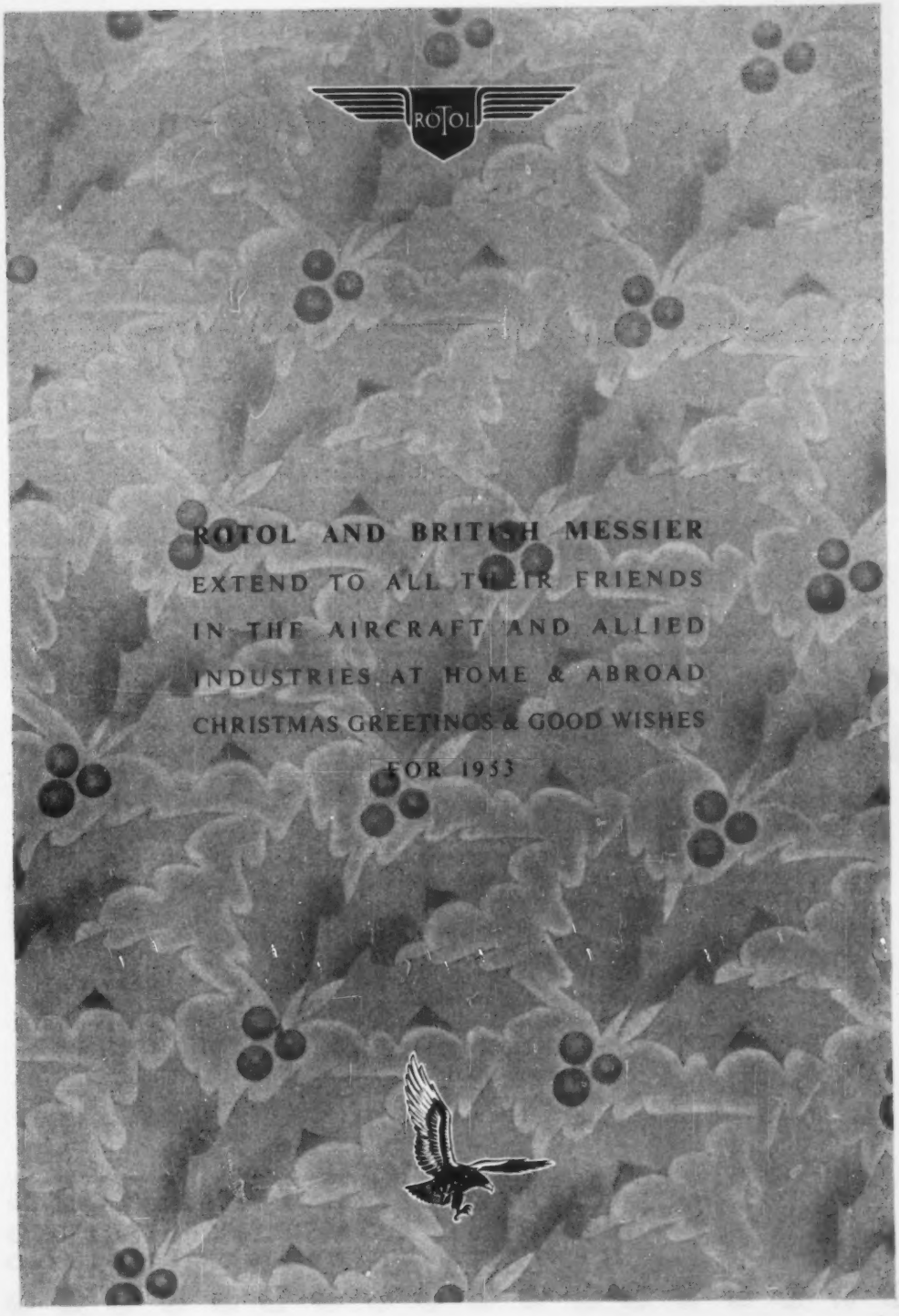
Rate of growth of Avro apprenticeship since 1950; at the present rate the target of 650, originally set for 1955, will be reached in 1953 (dotted line). The continuous gentler slope is the scheduled rate of increase.

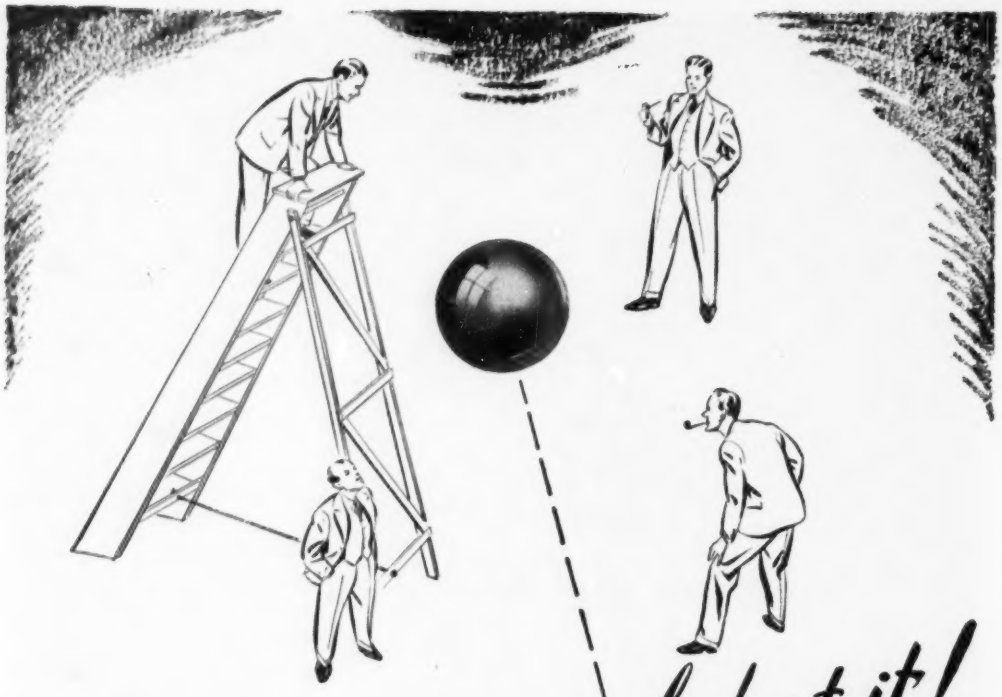
The curriculum followed by each apprentice is shown in the accompanying tables. Woodford, which appears at intervals, is the company's main assembly plant and airfield situated some miles to the south. All other training takes place in the Apprentice Training School, which is housed in the company's main factory at Chadderton. A floor plan of the school appears on page 783.

A noteworthy feature of the school layout is that it is, in effect, a self-contained unit; the apprentices have their own stores and (upstairs) their own canteen. They clock on at their own entrance and need never enter the main works at all. Classroom instruction is given in the lecture rooms, each of which can seat some 40 boys, and practical instruction takes place in the apprentices' workshop. The latter is unusually well-equipped, and contains several machine tools which no doubt many manufacturers would like to have for production purposes. It may be added that the psychological benefits of suitable lighting and paintwork have been fully appreci-

	Age		DETAILS OF TRAINING				Age	
	Years	Months					Years	Months
General	Up to 16	0	Usefully employed either as office boy or on preliminary design-office training section.		Probationary period		Up to 16	0
	16 to 17	8 0	Spent in the school	First 6 months on elementary and advanced fitting. Final 6 months on general machine-shop work.			16 to 17	0 0
	17 to 17	0 9	Detail-fitting benches in the works.				17 to 17	0 9
	17 to 18	9 6	Machine-shop	Capstans, 2 weeks; millers, 8 weeks; centre lathes, 8 weeks; autos, 8 weeks; drilling, 4 weeks; grinding, 4 weeks; presses, 6 weeks.			17 to 18	9 6
	TRADE →		FITTING-SHOP	MACHINE-SHOP	TOOL-ROOM	DESIGN-OFFICE, JIG-AND-TOOL, DRAWING OFFICE, PROCESS DEPT.		
Specialization	18	6 7 8 9 10 11	Tool maintenance and repair.	Capstans or millers according to choice.	Tool-room machine-shop. Turning, milling, shaping, grinding, and jig boring for selected apprentices. (Movement to various sections at discretion of tool room.	Interview with the departmental chief; if suitable, 6 months in the chosen department.	18	6 7 8 9 10 11
	19	0 1 2 3 4 5 6 7 8 9 10 11	Tool-room fitting.				19	0 1 2 3 4 5 6 7 8 9 10 11
	20	0 1 2 3 4 5 6 7 8 9 10 11	Assembly.	Millers or capstans. View room. Centre lathes. Tool layout.	Tool-room fitting-shop. Making small tools, press tools, large assembly fixtures, tool try-out, tool repair, pneumatic and hydraulic tool maintenance section. (Movement to various sections at discretion of tool room.)	Specialized works training as specified by the Departmental chief in conjunction with the apprentice supervisor.	20	0 1 2 3 4 5 6 7 8 9 10 11
			Inspection.					
			Detail benches and/or assembly.	Chosen trade.		Chosen department.		
	21	0	END OF APPRENTICESHIP				21	0

The table on the left shows the general progress of a Trade Apprentice through the Avro works in the course of his training. The initial twelve months is spent entirely in the apprentice training school; an exception to this is the Woodford apprentice, who passes this period at the company's airfield, where he receives an introduction to complex modern aircraft.


ROTOL
ROTOL AND BRITISH MESSIER
EXTEND TO ALL THEIR FRIENDS
IN THE AIRCRAFT AND ALLIED
INDUSTRIES AT HOME & ABROAD
CHRISTMAS GREETINGS & GOOD WISHES
FOR 1953



Which ever way you look at it!

R&M Steel Balls are as near to being perfect spheres as engineering science can produce, whilst the highly polished surfaces are indicative of the accuracy of this component in R&M Ball Bearings. From the raw material, through the forging process, heat treatment and precision grinding on special machines; at each operation the skilled inspectors equipped with the most modern equipment, reject all but the perfect ball.

These exacting standards of manufacture help to make R&M Ball and Roller Bearings the nearest thing to engineering perfection today.

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RANSOME & MARLES
BEARING COMPANY LIMITED
NEWARK-ON-TRENT, ENGLAND

K/RM94

AIRCRAFT APPRENTICESHIP . . .

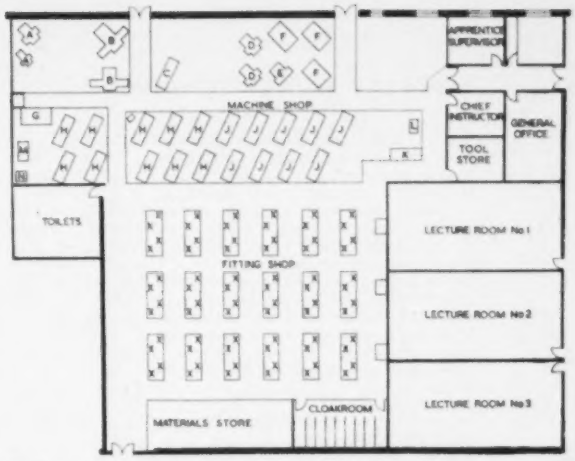
ated in this workshop. Apprentices are encouraged to use a technical library, a free surgery, and the canteen, where a hot dinner can be obtained for 8d.

The more academic training of the apprentices takes place in one of Manchester's main technical colleges. To permit this, all apprentices are given a part-time day release of up to two days per week for approved courses, during which time full wages are paid. All apprentices are exempt from the call-up and deferment can be extended in certain cases to cover periods of technical instruction which continue after the end of apprenticeship. Normally, however, the trained apprentice will be required to fulfil his National Service obligations as soon as his apprenticeship finishes. While he is in the armed forces his job waits for him.

Another fundamental change which took place in May of last year was in the administration of the training school. Originally it came under an executive staff committee. This was replaced by the Apprentice Training Committee, of which Sir William Farran, technical director, is chairman and which includes J. A. R. Kay, another director of the company; S. D. Davies, chief designer; T. Norton, chief inspector; H. Rogerson, assistant chief designer; C. Hatton, works manager; A. Stewart, production controller; M. S. Allen, labour committee; and, by no means least, H. Lomas, apprentice supervisor. This committee is in turn under the aegis of the Avro Board of Education Management, the chairman of which is Sir Roy Dobson and which includes all the directors and F. Greenhalgh, the labour manager, and all those of the Apprentice Training Committee with the exception of Mr. Rogerson. The Board of Education Management meets once every twelve months and is responsible for the education of all the staff; the Apprentice Training Committee is, in fact, a sub-committee to look after apprentices, vacation students and technicians under training, and it meets quarterly.

As can be seen from the curriculum tables, the first year of apprenticeship is spent entirely in the training school. With the increase in annual intake some difficulty was experienced in accommodating all the apprentices, but development has been effected in five stages to August of this year without any day having been lost.

Numerous extra-curricular activities are offered to the apprentices in addition, of course, to those available from the Avro Athletic and Social Institute. Older apprentices receive lectures during working hours. Specialized courses and lecturers can be arranged if the demand exists. Most of these classes are taken by senior Avro staff members in order to ensure that the instruction is practical and up to date. Throughout, the aim is to co-ordinate theory with practice and so supplement the work of the outside technical college.



The Avro school is completely self-contained. The key is as follows: A, vertical miller; B, Heller miller; C, lathe; D, horizontal miller; E, Milwaukee horizontal miller; F, shaper or planer; G, surface plate; H, lathe; J, capstan lathe; K, large radial drill; L, twin-spindle drill; M, furnace; N, blow-pipe; X, fitting bench.

Mention should also be made of the special scheme for trade apprentices at Woodford. Their training lies mainly in aircraft assembly fitting, and the engineering and maintenance of electric, pneumatic, hydraulic, radio, radar and armament systems. Woodford apprentices receive three months' fitting instruction and three months on machine tools before proceeding at the age of 16½ to the main Chadderton works for general training.

During apprenticeship, a boy can leave at any time without having to "buy himself out" in any way. In spite of this, no apprentice has left the Avro Training School during his period of training in the past two years; in fact, from the age of 16½ onwards, the wastage rate is virtually zero. Much of this is due to the excellence of the training which the apprentice knows he is receiving. Other contributory factors are the close liaison established between the company and the apprentices' parents and also to the opportunities for advancement which exist within the firm. A. V. Roe and Co. have an excellent record of promotion from the works and the staff to the highest executive positions.

At the end of apprenticeship, the student will have taken numerous academic examinations, usually in the order listed in the table at the top of the next page.

In addition to these qualifications, outstanding apprentices qualify for the award of numerous prizes donated by the company, by the 504 Club, and by a well-known Manchester tool-making firm. Marking for the award of prizes takes into account the apprentice's academic results and is weighted to allow for other factors, particularly personal conduct, time keeping and general initiative. The company also puts forward the names of one or two quite out-

Year of Training	Period Months	Location	Details of Training
1st	12	Apprentice School.	First six months: probationary period on elementary and advanced fitting. Final six months: general machine-shop work.
2nd	4	Assembly line.	Airframe structures, i.e. mainplanes, tail units, fuselages, etc.
	5	Machine shop.	Special-purpose machines such as autos, centreless grinders, hydromatics, millers, light press, etc.
	3	Heavy press shop. Drop-hammer shop and foundry.	Rubber press, Pels brake and square-up. Drop-hammer and foundry technique.
3rd	2	Manipulation Dept.	Section rolling, drawing and manipulation, including tube manipulation.
	1	Heat-treatment and protective treatment.	Heat-treatment and protective processes (plating, anodising, painting, etc.)
	2	Welding Dept.	Gas, arc and resistance welding.
	6	Aircraft services.	Hydraulics and pneumatics, 2½ months; electrics and instruments, two months; flying controls and other mechanisms, 1½ months.
	1	Chadderton tool-room.	Tool layout, repair and inspection.
4th	2	Chadderton tool-room (cont.)	
	2	Woodford assembly.	Final assembly for flight.
	2	Woodford.	Experimental flight shed.
	2	Woodford.	Aircraft research.
	4	Design office.	Commence on detail design.
5th	2	Design office.	Complete detail-design course.
	4	Eng. Research dept.	Structural and material testing, new process, etc.
		At this stage the final choice of career is made (after consultation with apprentice supervisor and departmental chief).	
	6	To be agreed.	This period at the discretion of the departmental chief. The apprentice supervisor to continue supervision.

The curriculum followed by an Engineer Apprentice. Transfer to the staff usually takes effect during the third year; standard draughtsmen's rate then applies, unless the apprentice has gained his H.N.C. and is employed in the technician's department, in which case he is placed on the technician's scale.

AIRCRAFT APPRENTICESHIP . . .

standing apprentices for consideration by the S.B.A.C., and other bodies, for the award of scholarships. These latter are usually worth about £270 per annum and are tenable for two years at Imperial College in London, or at Cranfield.

Finally, we may examine the results which Avros have achieved since the reorganization of their training school. As previously stated, some difficulty was experienced in accommodating the increased intake. The reason why the intake did increase is a curious example of psychology. For several weeks after the reorganization last year nearly every candidate who applied for apprenticeship was rejected. This led to a rapid increase in the number of youths applying, all of whom began to realize that one had to be considered thoroughly suitable before the company would award an apprenticeship. The results speak for themselves. The company wanted 30 engineering apprentices in the summer of this year; 70 applied and 36 were accepted, the rejected applicants nevertheless being of high quality. Of trade apprenticeships 80 had to be selected from over 500 who applied.

These figures show that the aircraft industry can attract the right type of young man in the face of competition from other industries—which are particularly powerful in Manchester—in which higher initial wages are paid. Unfortunately, the Avro-trained engineer is sometimes poached from his parent company after completion of his apprenticeship. In particular, numbers of men have recently been attracted by the aircraft industry in Canada. To such poaching it is difficult to find an immediate solution, but the small scale upon which it is at present operating is evidence of the faith at present held in the security which the aircraft industry can offer.

Year	Engineering		Trade	
	B.Sc.	Higher Nat.	City & Guilds	Higher Nat.
1	Inter.	O.N.C. (52)	W.1	Preparatory
2	Pt. I	O.N.C.	W.2	O.N.C. (S.1)
3	do.	A.1	Inter. B.Sc.	O.N.C. (S.2)
4	do.	Higher Nat.	W.4	O.N.C. (S.3)
5	Pt. II	Endorsement	Final	A.1

Although the foregoing account refers entirely to the activities of a particular firm, somewhat similar schools are run by several other firms in the industry. It should be at once clear that the aircraft industry is by no means a flash-in-the-pan attraction, but that it is likely to remain at its present size, or larger, through the foreseeable future. The stabilization of the industry is likely to be furthered by the present increasing emphasis placed on certain commercial aircraft of high export potential, whose demand is unlikely to fall away for many years.

APPRENTICES' AWARDS

AS previously related, we timed our visit to Chadderton to coincide with the 1952 prize-giving at the end of the apprentice year. This was held on December 12th and in the morning an exhibition of apprentices' work was opened for inspection by directors and heads of departments. The amount of practical work done in the first two months of apprentice training at Avros appears remarkable; bench-work begins with the usual filing exercises, but quickly proceeds to the manufacture of the apprentice's own tools, of which he makes nearly twenty in this period. Older apprentices exhibited actual production work—shackles, toggles, templates and jig-blocks—which naturally have to pass A.R.B. requirements. The apprentices actually on production work are given unlimited time, but realize that their output has to be perfect. Other exhibits included engineering drawings and examples of apprentice hobbies.

At the prize-giving ceremony, the apprentice supervisor, Mr. H. Lomas, announced that the total number under training had trebled since the last prize day and now stood at 450. He was followed by Sir Roy Dobson, managing director of the company, who is a past-master at addressing all kinds of audiences. The school, said Sir Roy, had plenty of good machines—enough for the purpose, anyway—but it was the men that he was principally interested in. Someone had to train the country's engineers, and he had before him Avro's quota. He wanted to see the continuity of employment from the bottom to the top of the company maintained; nearly all Avro's top men had grown up in the company. The speaker then compared British apprentice training schools with methods adopted in America. In the United States, he said, there were no real apprentice training schemes; the result was that they had no genuine tradesmen with a solid background of engineering, while boys who had never been in a workshop could arrive in a firm from college and immediately assume a managerial position. Avros were not reluctant to spend money on the school; at a rough guess he would say a five-year apprenticeship cost the company £1,000, but this outlay came back in the shape of a good staff in years to come.

He then presented the Avro 504 Club Trophy to the apprentice of the year, John Taylor, who also received his apprentice certificate, and a monetary grant for success in obtaining a B.Sc. First-Class Honours Degree. His outstanding record had been further rewarded by a scholarship to Imperial College awarded by the S.B.A.C. Awards

Sir Roy Dobson presenting W. Brookes with his cheque; all successful Higher National Certificate candidates receive monetary awards from the company. H. Lomas, apprentice supervisor, is on the right.

to other prizewinning apprentices were made as follows:

Apprentices of the Year (one engineering and one trade apprentice from each of the five years): W. Brookes, C. E. Morley, A. J. Walton, K. Entwistle, K. Bull, H. Morris, D. Parr, J. Reay, V. Taylor, D. Johnson, J. Wibberley, W. Simon. (There were two ties.)

Apprenticeship Certificates.—*Engineer Apprentices:* G. B. Bastow, W. Brookes, R. Broderick, C. M. Dawson, M. J. Fenton, A. J. Gunn, R. H. Hazelhurst, E. W. Hope, C. N. Huggins, S. Leek, E. Jackson, J. L. Kirton, J. D. Lilley, R. W. A. McCormick, R. G. Proudlove, R. B. Salmon, K. H. Spilsbury, R. Taberner, J. Taylor, D. A. Thirlby, R. Wilkinson. *Trade Apprentices:* T. W. Atkins, R. Cartwright, J. Clark, J. H. Bottomley, G. M. Elliot, D. Fenton, K. Fitzpatrick, H. Ingham, G. B. Lord, J. Moir, C. E. Morley, B. V. Redford, A. Smith, L. Smith.

Progress Prizes (best progress made during first year).—P. Pickwick, R. Lord.

Essay Prize (best essay submitted on one of five subjects).—P. Arthur.

"Kelly Prize" (sponsored by Robert Kelly and Sons for the best workmanship during first year).—J. F. McCuish.

Award for Higher National Certificate or equivalent.—G. B. Bastow, W. Brookes, G. Esilman, C. M. Dawson, A. J. Gunn, J. Guy, F. Jones, I. McCuish, D. Pierrepont, J. Taylor, R. Wilkinson, K. L. Yeomans, R. G. Proudlove, R. B. Salmon, E. W. Hope, J. L. Kirton.

Best All-round Apprentice.—J. Taylor.

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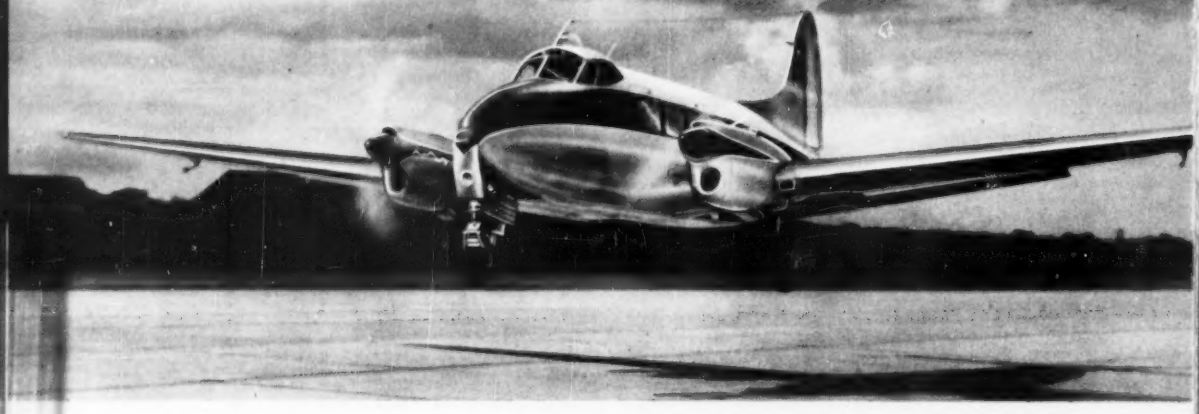

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NOW THAT MAN HAS TAUGHT HIMSELF TO FLY, AND HAS *put the air to his use as his forefathers used the sea, he is rewarded with the sight of new splendours in the realm of the sky. They change with the wind and the light, and he is gladdened or chastened by their moods; for he is still a dweller on the earth like the shepherds of* 1,952 *years ago. It is true that he can take pride in stately aircraft serving the cause of peace, and in noble deeds which further the new science of flight; but at Christmas his heart is filled not with this pride of achievement—only with humility and hope. He looks to the sky and sees the promise of peace on earth. At this time we send to readers the world over our wishes for a Merry Christmas and a Peaceful and Happy New Year.*

ELIZABET

As the First Elizabethans Explored the
Today New Elizabethans Link Nati

SIR FRANCIS DRAKE (1545-96). One of the great seamen of his time, Drake was at 22 captain of the *Judith*. He was knighted in 1581, after being the first Englishman to circumnavigate the world. He continued his expeditions after defeating the Armada, and it was during one of these that he died.

IT might be said that the great Elizabethans of the seventeenth century were inspired by their brilliant Queen to make dangerous voyages, to write great prose and verse and to become eminent statesmen and soldiers—although their rewards were sometimes barren. The roll of their names is enough to remind us of their spirit, and the portraits shown here represent some of the greatest of them all. So successful were these men in pioneering exploits that today it is sometimes asserted there is little more earth-bound exploration left for men to undertake.

This attitude of mind may change, however, if the reign of the present Queen can become a second Elizabethan era of daring and courage, linked to that earlier age by enterprise and achievement—if men are again inspired to make both physical and spiritual voyages of discovery, and to think for themselves. In this they will be greatly aided by our airliners and their crews—the modern e
Four hundred years a
lands was by sea, in
discomfort and some
In our new element
argosies of cloudland
have vowed were imp

It has been the p
name the flagship of
Elizabeth II, and the
of these portraits. E
namesake hung oppo
the appropriate signat
been devoted to this
are indebted for m
pages (copyright ackn

WILLIAM SHAKESPEARE (1564-1616). Born at Stratford, Shakespeare has achieved a place unique in English letters, and in his 38 plays he has treated of human life in a brilliantly imaginative manner, as well as writing poetry which has become immortal, including the controversial sonnets.

SIR RICHARD GRENVILLE (1541?-91). A famous seaman, he commanded Raleigh's expedition to Virginia in 1585-6, and was responsible for the defence of the western counties against the Armada. He was second-in-command of the *Revenge* in the Azores in 1591, and was mortally wounded.

SIR JOHN HAWKINS (1532-95). Hawkins, of a seafaring family, made several voyages as a young man, and he is known to have trafficked in slaves. He became treasurer of the Navy in 1573 and subsequently controller, and was knighted for his services as a Rear-Admiral against the Armada in 1588.

SIR THOMAS GRESHAM (1519-79). Gresham was apprenticed to a merchant uncle in the city, and gained wide experience, becoming a most successful financier. He was later "Royal Agent" in Antwerp, negotiating loans, increasing his country's credit, and always campaigning for a purer coinage.

EARL OF LEICESTER (1532-88). Although at court at an early age, and a favourite of Elizabeth, Leicester seems to have had little political influence, but he was given command of a Netherlands expedition in 1585. He was made governor of the Low Countries provinces in 1586, but was soon recalled.

SIR FRANCIS BACON (1561-1626). Bacon found he was "fitted for nothing so well as for the study of truth" after he went to Trinity College, Cambridge, in 1573. He was a favourite of Essex and later James I, having an active political career, as well as writing his great philosophical works and essays.

WILLIAM CECIL, *Lord Burghley* (1520-1598). Due to great acumen and caution, Burghley had a very long record as the Queen's counsellor; he was Master of the Court of Wards and Chancellor of Cambridge University. In 1571 he became a peer; in 1572 he held the office of Lord High Treasurer.

EDMUND SPENSER (1552?-99). Spenser was the earliest of the masters of the "new" English poetry. He had strong Puritan convictions and in 1580 satirized the Queen's proposed French marriage. Raleigh persuaded him later to present *The Faerie Queen* to Elizabeth, and it was well received.

T H A N S

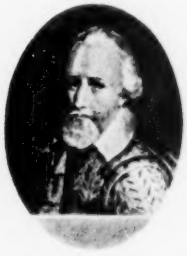
Farthest Shores, so
n to Nation

quivalent of Gloriana's undefeated fleets. go, the only way of the traveller to strange the slow, stately sailing ship, with harsh danger the lot of all who ventured in her. we are carried over continents in "the " at speeds the first Elizabethans would ossible.

rivilege of British European Airways to their Elizabethan fleet after H.M. Queen remainder after the illustrious subjects ach machine is to have a portrait of its ite the entrance door, with a facsimile of ure below. Much time and research have scheme by the Corporation, to whom we nt of the material reproduced on these nowledgments are detailed on page 778).

SIR FRANCIS WALSINGHAM (1530?-90). A passionate Protestant, Walsingham travelled widely, and studied politics and the law before entering the Queen's service. After forming a network of spies and informers he was able to uncover the Babington Plot to enthrone Mary Queen of Scots.

SIR CHRISTOPHER HATTON (1540-91). Hatton became Lord Chancellor of England in 1587, in spite of the fact that he was not a professional lawyer. He was reputed to be the Queen's favourite courtier, possessing good looks and many social graces, but is supposed to have died of a broken heart.



EARL OF ESSEX (1566-1601). One of the great romantic figures of Elizabeth's reign, Essex first distinguished himself at the battle of Zutphen in 1585. After Leicester's death he became the Queen's chief favourite, but various disobediences led to his imprisonment, and thence to his execution in 1601.

SIR WALTER RALEIGH (1552?-1618). Born in Devonshire, Raleigh was courtier, soldier, explorer and author; after leading expeditions which were extremely successful, he lost favour and was put in the Tower. Released to search for gold, he was later executed for attacking Spanish settlements.

SIR PHILIP SIDNEY (1554-86). Like many since, Sidney was a soldier and a poet; after Oxford he travelled, returning in 1575 to be sent on diplomatic missions. He was a friend of Spenser's; his best-known works are *Arcadia*, *The Defence of Poesie*, and the sonnets, all published posthumously.

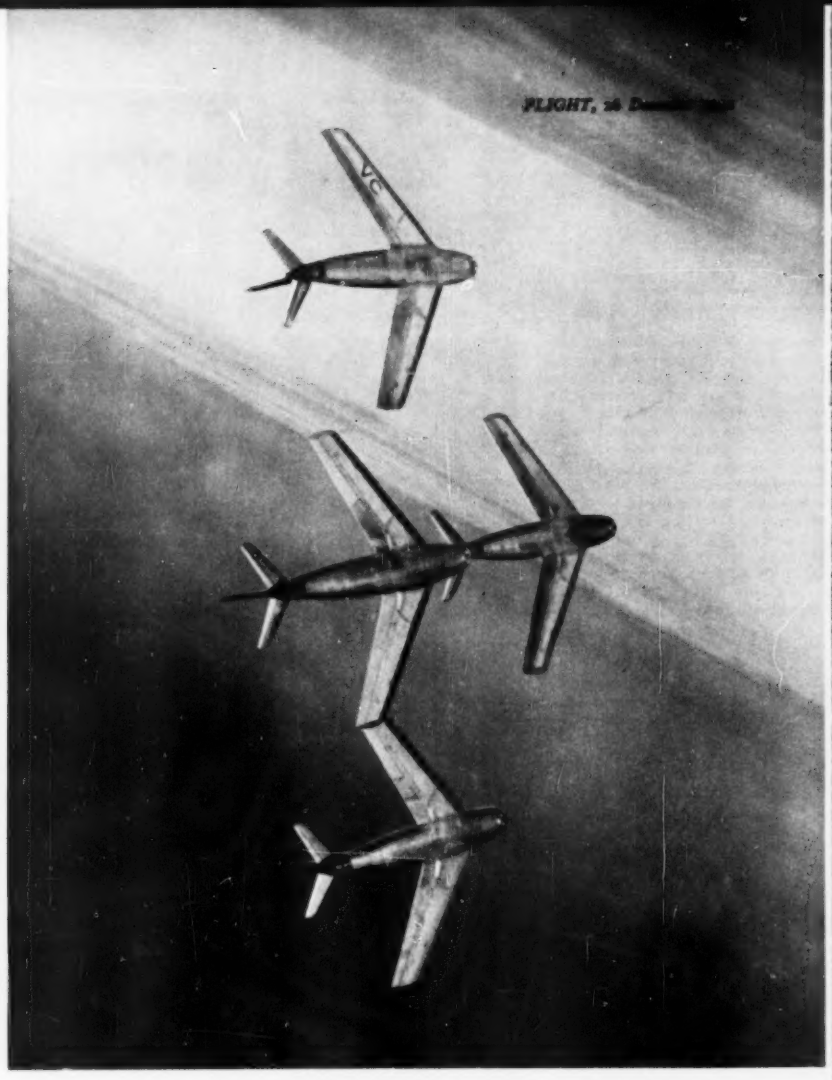
CHRISTOPHER MARLOWE (1564-93). A contemporary of Shakespeare, Marlowe joined the Earl of Nottingham's theatrical company after leaving Cambridge. Perhaps best known for his plays—*Tamburlaine*, *Dr. Faustus*, *The Jew of Malta* and *Edward the Second*—he was also a most accomplished poet.

SIR JOHN NORRIS (1547?-97). An able military commander, Norris gained fame by his exploits against the Spaniards. But in 1585 the command was Leicester's and they disagreed. Later Norris, who died in Ireland, led a force with Drake against the Spanish and Portuguese coasts.

LORD HOWARD OF EFFINGHAM, *Earl of Nottingham* (1536-1624). Lord Howard was made Lord High Admiral in 1585, and was commander-in-chief of the fleet which defeated the Spanish Armada. He continued in favour under James I, and was later made Lord Lieutenant of England.

SIR ROBERT CECIL (1563-1612). Son of Lord Burghley, Cecil became Secretary of State in 1596, and was made Earl of Salisbury in 1604. He had a love of building and planting, and was given the estate of Hatfield. For much of the magnificence of Hatfield House he was personally responsible.

SIR FRANCIS KNOLLYS (1514?-96). There is some doubt of the authenticity of this portrait of a staunch Protestant, who lived in Germany during Mary Tudor's reign. A favourite of Elizabeth, who called him "an honest man," he was given custody of Mary Stuart, who he tried to convert.



SABRE DRILL

GRACEFUL as the skaters on the Fens far below them, four Canadair-built North American Sabres of No. 410 (Cougar) Squadron, Royal Canadian Air Force, might have been seen a few days ago tracing a corkscrew pattern across the winter sky. They were flown by F L. G. H. Nichols, F O. L. J. Bentham, F O. A. M. Robb, and F O. D. G. Cinnamon, seen below with their squadron commander, S L. D. Warren (second from left). Through every foot of their gigantic roll they were dogged by a Gloster Meteor 7 of No. 12 Group, R.A.F., piloted by F L. H. Minnis (left) and with *Flight*'s John Yoxall in the rear seat. As the horizon reeled and the Sabres passed "over the top" the camera shutter clicked, with the above result.

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EDUCATION AT HATFIELD

New Technical College Opened by Duke of Edinburgh: Aeronautical Emphasis

AS might be expected from its location, the Hatfield Technical College, officially opened by H.R.H. the Duke of Edinburgh on Tuesday, December 16th, has strong connections with the aircraft industry. The first connection is basic, for the 90-acre site on which the College is built was donated in 1946 by Mr. A. S. Butler, then chairman of the de Havilland Aircraft Co., Ltd. Other links with the industry and with nearby de Havillands are seen in the emphasis placed on aeronautical engineering subjects in the College syllabus.

Hertfordshire and its students are indeed fortunate in possessing such a College, the first of its kind in the country. The spaciously modern buildings make a striking and pleasing first impression, and have been planned architecturally in conjunction with the new technical secondary school now being built alongside. The functionalism of the design is not too harsh, and the result surely approaches an ideal environment for sound education, technical or otherwise. Notable features are the large main assembly hall, and the high standard of contemporary furnishings and decoration throughout the College.

In starting from scratch, with new buildings, new staff and no restrictive past tradition, the College's principal, W. A. J. Chapman, M.Sc. (Eng.), Ph.D., has been able to reflect the new ideas of the architecture in the teaching method. Of his new ideas, possibly the most notable are the adoption of a four-term year and the provision of social and economic studies for engineering students. This latter is of basic importance in educating (as opposed to cramming with technical facts) the College's students, and the progress at Hatfield in filling this definite need will be watched with interest. Arranged by the Department of Social and Professional Studies, group discussion and project methods are used to examine human society and so to help to provide a wide and balanced outlook.

Four-term Year

In describing the academic year of four 11-week terms, Dr. Chapman stated that the intention was to fit in with the needs of industry. The scheme, admittedly experimental, would be especially convenient for the provision of short courses, and it was the intention that members of the academic staff should return to a period of industrial or research work during one of the four terms each year. The total number of students at present is 1,400, 50 of whom attend full-time courses and 700 of whom are apprentices and other employees released from their firms for 1 or 1½ days per week.

The head of the Department of Technical and Design Engineering is an aeronautical engineer, Mr. A. N. Barber, B.Sc., D.I.C., A.F.R.Ae.S., who was previously at Hull Technical College. The aim of his department is broadly to train mechanical, aeronautical and electrical engineers for the Ordinary and Higher National Certificates and for the examinations of the professional bodies, although as the College develops, the scope of the courses will be widened and full-time degree courses are envisaged. A useful and popular three-year course in ground maintenance has been started, leading up to the A.R.B. ground engineers' licences, and plans for a maintenance hangar with aircraft have been prepared.

The majority of the aeronautical students at the College naturally come from the de Havilland company, together with a number from Percivals at Luton, and consist mainly of "one day per week" apprentice students. For the de Havilland apprentices, the College has taken over from that company's Technical School most of its basic theoretical teaching, but the company's workshop and drawing office training facilities are still used. Several graduates in mathematics and mechanical engineering employed by aircraft firms are receiving their aeronautical training at the College in preparation for the R.Ae.S. examinations. Advanced short courses for evening students in aero-elasticity and servo-mechanisms are being planned for this session.

H.R.H. The Duke of Edinburgh inspecting the College's de Havilland Gipsy engine; a sectioned turbojet is in the foreground.

The department's accommodation includes laboratories for structure-testing, ground engineering, aerodynamics, and metallurgy. A general-purpose low-speed wind tunnel is being built for the College by the Airscrew Company and Jicwood, Ltd., Weybridge, and is soon to be installed; a demonstration smoke tunnel is at present in operation. A "Farnborough-standard" sectioned model of the Ghost turbojet is among the engine equipment displayed. The College's other four main departments are those of Works and Production Engineering, Building, Commerce and Retail Trades, and Social and Professional Studies.

The students' social and other non-academic interests are guided by the Students' Union, whose chairman is Mr. M. A. Cartledge, an Australian student from de Havillands, at present studying production engineering. A gymnasium and library form part of the present buildings, and space on the adjoining land has been earmarked for playing fields and a running track. It is also hoped to build a hostel for resident students in the near future.

All these indications point to a uniquely well-balanced educational community. In these modern surroundings lies much of value to British aeronautics, and the development of the facilities, scope and teaching method at Hatfield Technical College will be followed closely, for its value, both immediate and potential, is high.

I.A.L. CONTROLLERS AT CRANFIELD

AN agreement has been reached whereby the airfield of the College of Aeronautics, Cranfield, will be provided with three air-traffic control officers by International Aeradio, Ltd. These controllers will be under the direct operational control of the head of the Department of Flight at the College, W/C. C. G. B. McClure.

Cranfield's airfield is used by a diversity of aircraft types, including jet fighters, and has one of the highest movement-rates among civil airfields in this country. Both Pan American and B.E.A. use it for training purposes, the facilities—which include I.L.S.—being particularly useful for instrument-flying training.

The operators at their desks, from which, under the orders of a traffic controller, each simulates the movements of an aircraft. A battery of projectors (left) throws white spots, indicating the aircraft movements, on to a screen representing the terminal area.

SIMULATED TRAFFIC CONTROL

A Method of Testing New Procedures

THE accompanying photograph shows one of the main units of a novel type of simulator which has been developed by the U.S. Civil Aeronautics Administration Technical Development and Evaluation Center at Indianapolis, Indiana. The equipment is designed to test air-traffic control methods with a view to their simplification and development.

The "traffic" studied is entirely synthetic. It emanates from a line of control desks manned by operators who act as "pilots" and transmit the course, speed and other details pertaining to the behaviour of the aircraft in which they are assumed to be, their transmission being made according to the orders of a traffic controller. The signals from each "pilot" are fed to actuators which move, in azimuth and elevation, a projector—one for each "aircraft"—which beams a pencil of white light on a 12ft by 12ft screen upon which is superimposed a map of the terminal area being studied. The screen is then televised and the picture transmitted to a number of P.P.I. tubes mounted in conventional air traffic control consoles.

The position of each "aircraft" then shows as a white dot on the tube face, to be handled in accordance with the procedure under investigation. The three agencies involved are the aircraft (simulated, as seen in the photograph, by a number of women operators); the air-traffic control centre (simulated by personnel at a separate desk); and the airport control tower (simulated by the surveillance radar tubes fed by the televised screen-picture and monitored by acting tower-personnel). The intelligence passing between these three centres is recorded by various means and analysed to provide details of the work demanded of each operator, the amount of communication required, the delay to scheduled aircraft, possibility of error and general ease of the control procedure.

One of the "pilots" is seated in a Link trainer to test pilot reactions under instrument-flight rules. Added flexibility is provided by the infinite variety of terminal maps which can be projected. This allows any desired positioning of radio ranges, fan markers, and the like, over which the aircraft can be routed as convenient.

There is no doubt that the arrangement of this system can be modified to permit the study of any air-traffic control problem; again, it should be cheap to operate, and should allow any hazardous situation to be repeated as often as necessary without any risk to those taking part. Perhaps the only shortcomings are the too-excellent clarity and brilliance of the "aircraft" as shown on the cathode-ray tube and the fact that these light-spots leave no trail as they move; but such minor points, if deemed sufficiently important, should be capable of easy solution.

FOR COMFORTABLE HEARING

Relief from the Heavy Headset

THOUGH many civil aircrew-members manage to wear R.T. and intercom. headsets without trouble, others find the headband, and the pressure on the ears, irritating and fatiguing and liable to cause headaches. There is also the disadvantage that one earphone must be lifted in order to hear direct speech.

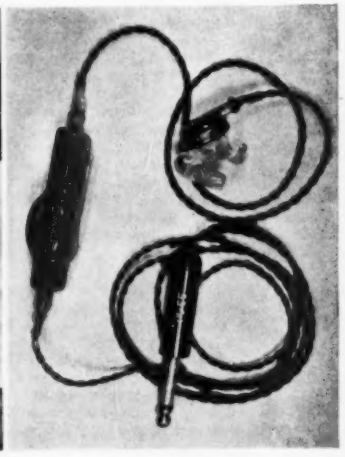
We have noticed that a number of American airline personnel are wearing particularly neat earphones of the "hearing-aid" type, and a description of such equipment has lately been received from the States.

Designed by a pilot named R. M. Hecox, the "Airphone" consists—as will be seen from the illustrations—of an individually moulded plastic ear-attachment (weighing half an ounce); volume-control to clip to the breast pocket or coat-lapel; wiring; and jack.

The device is stated to be insulated for 900 volts, and to have an impedance of 400 ohms and an average sensitivity-curve varying by less than eight decibels on either side of a norm between frequencies of 100 and 2,700 cyc/sec.

Among advantages claimed for the device is that it prevents a pilot confusing right and wrong lobe-signals when flying on a radio range; such confusion may occur through the pilot turning-up his radio-range volume and then adjusting the jack-box volume-control to its lowest level. The sensitivity of the new phone compels him to adjust his receiver to a low volume, thus cutting out unwanted and misleading signals.

The equipment is manufactured by the Airphone Company, Calumet Building, Miami, Florida.



The designer, R. M. Hecox, wearing the "Airphone." Details, right.

THE PERISHING PILOT

By PATRICIA STROUD

THE realization has been forced upon us that pilots are getting smaller.

Two or three Farnboroughs ago it was still possible, sitting on the grass at take-off point, to recognize the man at the controls of even the fastest aeroplane. There, in the cockpit, was a man-sized pilot, so that although the new type of aircraft might be obscure, the man inside gave us a clue to its origin.

We are disturbed by this apparent diminution of our biggest heroes.

The giants of the past sat at their posts in uninterrupted glory and, in case some myopic spectator might have failed in his recognition, possessed some additional feature to aid the onlooker. Thus, if the "Cathedral" itself brought no apparent response, S. F. Cody's three-point moustache and beard left an indelible impression. Claude Grahame-White could rely on a certain sartorial grace to catch the attention while waiting, a little like Patience on a monument, for the wind to die down.

The pilots of the First World War flew past in understandable anonymity, trailing a fluttering silk stocking or scarf; but only a haberdasher could have told them apart—though Hollywood has its own ideas on the appearance of the Red Knight.

It was a simple matter to identify a Mew Gull when one could see Edgar Percival and hat framed in the cockpit, although by then aviators' bodies and legs had long since disappeared from view; and no Hart or Demon could streak by without betraying the presence of George Bulman as a sudden flash of light bounced off his highly polished pate.

Nowadays, however, one would swear that the cockpit is empty, or, when a tiny figure *can* be seen, it appears to be only the helmeted head of a Toytown robot.

The only place in which a pilot can still enjoy his full stature and show his face and his bedroom slippers is in the helicopter's goldfish bowl; although, from the expression on the face of the Editor in a recent photograph, we must assume that either he had subjected himself to rather high *g*, or that he found his unaccustomed exposure embarrassing.

Can we hope that perhaps Mr. Petter is now getting things back into perspective?

"Flight" photographs

". . . found his unaccustomed exposure embarrassing. . . ."

". . . three-pointed moustache and beard . . ."

". . . a certain sartorial grace . . ."

". . . and hat framed in the cockpit."

(Below) ". . . his highly polished pate."

CORRESPONDENCE

The Editor of "Flight" does not hold himself responsible for the views expressed by correspondents in these columns; the names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

"Bif"—Not "Brisfit"?

I VERY much appreciated a recent article by Mr. J. M. Bruce on the Bristol Fighter, and the subsequent spate of correspondence. There is one point, however, which from a historical interest point of view should be corrected.

The Bristol Fighter has been referred to as the "Brisfit"—a horrible abbreviation, which I do not think could be justified in any way.

When I learned to fly at No. 5 F.T.S., Shotwick, in 1923, the Bristol Fighter was one of three types on which we trained, the others being the Avro and the D.H.9A. Subsequently I flew the Bristol Fighter again at Farnborough in 1925, and naturally came across many squadrons operating them during my first tour of duty with the Royal Air Force.

At no time was this aircraft referred to as the "Brisfit," it was always called the Bristol Fighter, or, when a short name was required, the "Bif."

I think this modern tendency to give new names to old aircraft should be resisted, as otherwise we shall shortly be hearing of the "Sopsnip" and the "Vicvim."

Thruxton, Wilts. J. E. DORAN-WEBB, Sqn. Ldr.

I WOULD like to add my own congratulations and thanks to those of other of your readers, to Mr. Bruce and all concerned in the instigation and execution of the current series of articles on historic military aircraft. They are of interest to my own generation, to whom the aircraft are legends, and equally to that to which my father (who can supply me with some personal reminiscences) belongs; in the hearts of the latter the first sight of those aeroplanes evoked feelings very similar to those stirred by the sight of Princess or Vulcan today.

Cambridge. PEDANTICA.

Hydro-Skis

I READ with interest your article (December 5th) on the development of the hydro-ski in this and other countries.

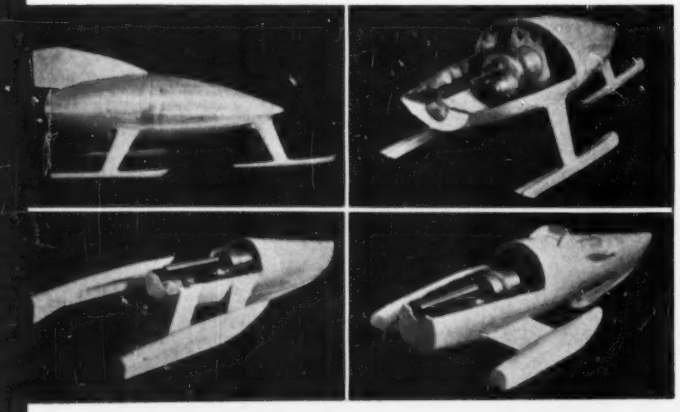
Inter-alia, your contributor states that the *Crusader* did not represent the true hydro-ski.

It might be of interest to note that as far back as March 1949 we were running a model (photographs of which are enclosed) that provided us with much valuable data and which was in fact surprisingly fast and stable. The float or sponson is a development of the hydro-ski which is evolved more or less inevitably when real load carrying qualities are required from the same surfaces. This is seen in the photo of the Grumman hydro-ski included in your article.

This letter is in no way intended to detract from the merit of other English developments in this direction by Saunders-Roe, whose investigations are quite separate from ours and for a different purpose.

Portsmouth, Hants. PETER DU CANE, Managing Director, Vosper, Ltd.

Three versions of the test model referred to in the letter, above, from Cdr. Du Cane. The two top views are of the original three-ski model with aerodynamically stable fuselage. Left, below, is a first attempt with floats, and right is the final development. A rocket-motor made by Wilmot, Mansour and Co., of "Jetex" fame, provided propulsion.



De-complicated Disinflation

WHILE not being unappreciative of the disinflating trend in aircraft designs de-secretized by Mr. Ed Heinemann's comments ("Aircraft Intelligence," p. 695, *Flight*, December 5th) which were not without reference to the A3D bomber, one might hope that in the not-too-distant future the de-complicating of his unsimplified remarks will be not uncomparable with the de-complicating of the aircraft to which he referred!

Leeds. R. D. C. PASSEY.

Helicopter Stations

YOUR correspondent Patrick D. Rawlence (November 28th) is not very logical. By analogy with Railway Station we should have Road Station and —— what? Air-Corridor Station? By analogy with Bus Station we should have Train Station and Aircraft Station. And by analogy with Air Station we should have Land Station for both trains and buses!

But to blazes with logic! He is absolutely right.

Horning, Norfolk. N. YOUNG, Wing Commander (Ret.)

A Matter of Time and Money

IN several past copies of *Flight* (notably that of December 7th, 1951) we have seen that certain correspondents have observed little enthusiasm for private flying amongst the under-twenties.

We are technical apprentices in the aircraft industry and would like to learn to fly, but the basic cost of a course is prohibitive, apart from incidental expenses such as fares. We would therefore greatly appreciate any suggestions enabling us to overcome this difficulty, bearing in mind that Sunday is our only free day.

This may seem a "something for nothing" attitude to some; we feel differently, but, like many others, cannot afford the full rates.

London, N.W.2. C. S. HALLIWELL, D. F. LANG.

[A prevalent problem, about which we had something to say in a leading article, "Encouragement to Fly," in the issue of December 5th.—ED.]

America and British Engines

IN view of the recent American disclosures concerning the Rolls-Royce Conway, it is to be hoped that the M.o.S. will review the question of granting manufacturing licences.

Admitting the necessity for having the best engines installed in the best airframes, the point should be studied from both the economic and security viewpoints. The entire American gas-turbine industry is based on British developments and, whilst in time of war access had to be allowed to our patents, the position is now very different. The supremacy of our new civil machines depends on their power units and unwise granting of licences and information may seriously affect our export trade later on. The civil use of the Nomad, Conway and Olympus is, I think, only a matter of time; and to put these and other units into the hands of potential competitors, no matter how much is made of the military need of them would, I feel, be foolishness of the worst kind.

We shall have enough to do in meeting American competition a few years hence, without handing them their motors on a plate.

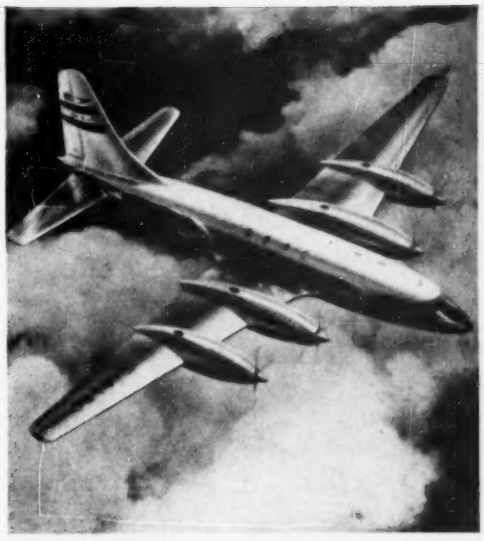
Kingston-on-Thames, Surrey. J. TATTON-WINTER.

Scrap-heap Squadron

YOU recently published a summary of the memorial lecture devoted to the life and work of the Vickers designer, Rex Pierson. In that article reference was made to various aircraft which were built by Vickers and some account was given of their history.

I was very interested to read the references to the Wellesley, but was distressed to read that it was used "up to the early years of the war" only.

I may, of course, be one of those who only count 1939, 1940 and 1941 as early years, but to my mind the Wellesley has been slighted. To my certain knowledge these aircraft were in *operational* use as late as March 1943 in the Middle East. They were used by what was known as No. 47 Squadron (Wellesley Flight) on anti-submarine patrols. The flight was based at St. Jean, Palestine, and the Wellesleys patrolled from there to Cyprus, and then to Mersa Matruh.



The aeroplane

The Bristol Britannia airliner.
At present undergoing tests before entering service with B.O.A.C. Four Proteus turbo-prop engines give the airliner a 5,600 mile non-stop range. Span 140′, length 114′.

the pilot

46-year-old "Bill" Pegg has been in aviation ever since he joined the R.A.F. as an air-struck apprentice of 15½. Now he holds a well-earned O.B.E. after 17 years with "Bristol", 5 as chief test pilot. One of his greatest moments was piloting the enormous Brabazon I on her maiden flight. Has now flown over 5,000 hours in 180 different types of aircraft — including the new Britannia. Says he has "always found Shell and BP Service efficient and courteous."

SHELL and BP Aviation Service

Shell and BP Aviation Service is much more than a fuel lorry and a length of hose. It's a service used by everyone who matters in aviation. Manufacturers for their engine tests. World wide airlines. Local charter companies and the chap down the road who goes up on Saturday afternoons. You too can use it at all the major airfields in Britain.

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THE ORIGIN AND DEVELOPMENT OF

British air services to Australasia

In March, 1919 the Australian Government offered a prize of £10,000 to the first Australian airman who succeeded in flying from England to Australia in a British aircraft in thirty days or less.

Six crews competed. The winners were the Smith brothers, Ross and Keith, who left Hounslow on 12th November, 1919, in a Vickers *Vimy*. After surmounting almost incredible difficulties in their 28-day flight, the Smith brothers landed at Darwin on the afternoon of 10th December.

The next great step forward came in 1926 when Sir Alan Cobham flew the first return trip between Britain and Australia in a DH 50 seaplane, closely approximating the route now flown by B.O.A.C. in association with Qantas. Two years later, in 1928, Bert Hinkler flew from Britain to Australia in 15½ days. In 1930 Sir Charles Kingsford Smith flew to Australia in just under 10 days.

Meanwhile Imperial Airways, a predecessor of B.O.A.C., had begun the first through service between London and Karachi in March, 1929. In the summer of 1933 this service was extended to Calcutta. In October of the same year a weekly service was operating to Rangoon and by December, 1933, Singapore became the eastern terminal. Early in 1934 Qantas Empire Airways Limited—combining the interests of Imperial Airways and Queensland & Northern Territories Aerial Services—was formed to operate between Singapore and Brisbane, thus completing the last link in the chain between Britain and Australia. A weekly air mail service operated from the end of 1934 over what was then the longest single air route in the world—12,722 miles—and the scheduled time for the journey was 12 days. Passenger services between Britain and Australia were inaugurated in April, 1935.

In 1937 Imperial Airways introduced "C" Class 4-engined flying boats on the Commonwealth routes. By July of the following year they were spanning the entire route from Britain through the Far East to Australia. The journey to Sydney took 9½ days. In April, 1940, the service was extended from Australia to New Zealand with *Empire* flying boats operated jointly with Tasman Empire Airways Limited.

The amalgamation of Imperial Airways and British Airways into a single public corporation—British Overseas Airways Corporation—took place shortly after the outbreak of war. The Japanese invasion of Malaya and Burma caused the suspension of services to Australia. Calcutta became the eastern terminal of British air services. The air link with Australia was restored in July, 1943, with the inauguration of a flying boat service between Perth and Ceylon. This service was subsequently extended via India and the "Horse Shoe" route to Britain. It was operated for B.O.A.C. by Qantas, using long-range *Catalinas* on the 3,513-mile flight across the Indian Ocean—the longest ocean crossing ever made in a regular air service. *Liberators* were later introduced on the route.

In 1944 the U.K./Australia service was again routed through the re-opened Mediterranean. In June, 1945, a *Lancastrian* service was started by B.O.A.C. in conjunction with Qantas. Flying boat service with *Hythes* was re-established in May, 1946. *Constellation* airliners replaced flying boats in December, 1948, providing frequent services in each direction between London and Sydney. This 12,000-mile journey is flown in under 4 days with intermediate stops at Zurich, Beirut, Karachi, Calcutta, Singapore, Jakarta and Darwin.

Today's 43-passenger *Constellation* service from Britain to Australia in under 4 days is a far cry from that 28-day, prize-winning flight of the Smith brothers in 1919. Progress like this is indeed a noteworthy achievement and an enviable testimonial to British planning, determination and unrivalled airmanship.

B.O.A.C. TAKES GOOD CARE OF YOU TO ALL SIX CONTINENTS

FLY BRITISH BY B·O·A·C

BRITISH OVERSEAS AIRWAYS CORPORATION IN ASSOCIATION WITH
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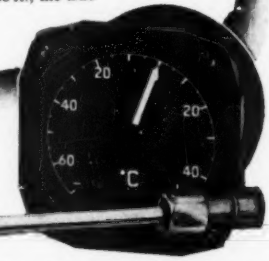
ACCURATE INDICATION OF AIR TEMPERATURE GOVERNS THE WHOLE ECONOMY OF OPERATION

Weston Thermometry has been chosen for several applications on the De Havilland 'Comet' including fuel temperature, cabin air temperature, wing and tail de-icing as well as outside air temperature.
Illustrated is the Model S.110G/9 Thermometer Bulb with its associated Indicator, the Model S.63 circular scale Ratiometer used for outside air temperatures.

Flight Planning The air temperature is one of the most important factors in the operation of a long-range jet aircraft as it influences the rate of climb, the heights at which the aircraft will cruise, and hence the true airspeed. The latter in turn determines the specific range (air miles per pound of fuel) since within limits, fuel consumption per hour at the normal cruising altitudes does not vary much. It can be seen therefore that air temperature controls the choice of flight path, largely determines the fuel load carried, and governs the whole economy of the operation. The effect of air temperature on Comet operations can be illustrated by the fact that a 10°C. rise in temperature reduces the cruising altitude by 2,000 ft., the true airspeed by 13 knots, and the cruising specific range by 2%.

From the article "Operating the Comet" by D. O. MacDougall in the May issue of Shell Aviation News.



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CORRESPONDENCE . . .

Legend had it that when 47 Squadron, which had used its Wellesleys to good effect in the Eritrean campaign, came to Egypt in 1941, it was to be re-equipped with Beauforts, but, no such aircraft having arrived, the squadron was left to its fate at 107 M.U., without aircraft. After several months the aircrew got restless, and it was decided to "find our own kites if the R.A.F. can't do it." So a tour was made of all the "graveyards" in M.E.F., and sufficient Wellesley hulks and spares were found to enable 47 Squadron to build up about six or more Wellesleys from the hulks. When A.H.Q. heard the news over the grapevine, it was decided to use the private-enterprise-built squadron operationally. What happened after March 1943 to these relics, I don't know—perhaps they are sitting in graveyards somewhere in M.E.F. even now, waiting to be brought to life again.

I know that one at least of the Wellesleys used at this time had the long-chord cowling associated with the aircraft which took part in the long-distance record flight to Darwin.

Tangier, Morocco. R. R. OLLETT.

Met. Halifaxes

A CORRESPONDENT, Mr. P. J. R. Moyes, in your issue of December 5th, makes several misleading statements about Halifaxes on war-time meteorological reconnaissance.

They were not, as he says, conversions of Mark 2 series 1s and 1As withdrawn from Bomber Command, but were produced as Mark 5s, complete with Dowty undercarriages, by the Rootes Securities shadow factory at Liverpool. Conversion to the meteorological-reconnaissance role was carried out by Cunliffe-Owen at Eastleigh and not, as Mr. Moyes says, by Handley Page at Radlett.

These Mark 5s were replaced by Halifax 3s and 6s and not, as he says, by the Mark 4—which was never built.

London, N.W.2. J. R. COWNIE.

Early Target Gliders

THERE was much of interest in Mr. E. G. Riddle's remarks in his letter (November 14th) on "The First Guided Missile." I was one of the two who did the glider releases from Gosport, to which Mr. Riddle refers. F/O. Brooks was the other.

The gliders, which were of 18ft span, had a small tab rudder and elevator, which were gyro-controlled. As far as I can remember, the gyros were driven by powerful clockwork, and ran for about half an hour. They kept the glider on a steady course and glide, the course being that on which they were released.

We had a Westland Walrus (the old land type) and a Blackburn Fleet Spotter fitted with a "carrier" for the glider on the top wing. The tail of the glider rested on a bracket which gave the whole glider slight negative incidence, and two jaws held the front of the glider to the aircraft.

Having set the gyros in motion we used to take off with the glider, climb out to sea, and aim at the ship which was going to do A.A. firing practice. From about 2,000ft we released by two movements of a lever in the cockpit. The first movement dropped the tail of the glider to give positive incidence on the glider wings, and the second movement opened the jaws, which allowed the glider to climb rapidly above us, stall behind us, and then go on its steady glide towards the ship. Launches salvaged the glider after it had ditched, and it was then available for examination for damage from gunfire.

I believe the scheme was devised as a test, for settling a difference of opinion between the Navy and the R.A.F. as to whether aircraft on fleet manœuvres had been "shot down" or not during low-level torpedo attacks on ships, before they could have released their torpedoes.

Upton, Dorset. C. G. HANCOCK.

Veteran DC-3

ON seeing your illustration "Still going strong" on page 628 of *Flight* for November 14th, I was prompted to send you the enclosed photograph, which you might find of interest.

In addition to the converted Dakotas which are still giving such useful service in the Swissair fleet there is this aircraft HB-IRA which is one of the original pre-war DC-3s and has now totalled 15 years of airline service. Coming into service in June 1937, HB-IRA was seen on the London route that same year, flying regularly into Croydon. Two years later it was confined, by the war, to the few routes Swissair was able to maintain; but with the coming of peace this aircraft was again to be seen coming into Croydon. In the post-war years it has flown regularly to this country and the photo shows HB-IRA at Heathrow this summer.

There are several points of detail difference between this aircraft and the normal Dakotas but the most noticeable difference is in the engine note, which is reminiscent of the Junkers Ju.52/3ms which used to be IRA's companions at Croydon in pre-war days.

Whilst writing to you might I add my praises to your other correspondents over the D.H. 4 and Brisfit articles. They are superb and it is to be hoped that they will be followed by more.

Ewell, Surrey. J. D. R. RAWLINGS.

The Swiss Dakota mentioned by Mr. J. D. R. Rawlings.

The English Electric Wren

AN item in your issue for November 21st particularly aroused my interest. Col. Bowden's letter, "Dinghies of the Air," mentioned the English Electric Company's little Wren. I believe one of these little machines still exists at the English Electric factory at Preston; it would be interesting to resurrect it and fit a modern engine to see if Col. Bowden's theories are borne out. In any case, it would be a most interesting little type to have in existence anyway; always assuming that the airframe does exist.

Grimsby, Lincs. P. H. T. GREEN.

A Contented Private Flier

FROM time to time a correspondent in your columns asks about club flying, and, although there is a steady stream of news about racing, rallies and social functions, there is rarely anything which could be described as a current exposition of the type of flying which is within the grasp of the ordinary individual.

I do feel, however, that such correspondents should make the initial move themselves; the clubs exist to serve them.

It has been repeatedly asserted that this country is too small to make private flying worth while. My experience is that it is just about the right size to make flying very worth while. The only time I can count on having the uninterrupted company of my husband for any length of time is upon a long journey in a small aircraft. At most other times the telephone can intrude. On a car journey the need for concentration, even at quite low speeds, rather spoils this pleasure. But on a cross-country flight the pleasure is quite unspoiled. Once clear of the circuit, we can all relax. The children are strapped in and cannot fall out or undo doors. I wish the same glamour attached to straps in a car. Children make the same uproar in an aeroplane, but the engine soon gets the upper hand. How nice it is, as the country drifts slowly by, to look down on the traffic-jams in market towns! These towns look quite pretty from above and do not entail the worry and frustration that they would upon a car journey.

In my opinion, too little is made of the pleasures of ordinary local flying and cross-countries. This sort of thing can quite adequately be dependent upon the background of a flying club.

In some respects the club member is better off than the private owner, for a club frequently maintains a very close and friendly watch upon its members. The gossip and chatter in a club provide a much easier way of keeping up to date with regulations than the formal study of notices and so on.

Elstree. PRIVATE FLIER.

FORTHCOMING EVENTS

Dec. 30. Plymouth Aircraft Recognition Society: Meeting.
Jan. 3. British Interplanetary Society: "Planetary Engineering," by E. Hope-Jones, M.A.(Cantab.), F.R.A.S., A.M.I.Mun.E.; "Landing on Airless Planets," by R. A. Smith.
Jan. 17. Aircraft Recognition Society: Sixth All-England Recognition Contest.
Jan. 17. British Interplanetary Society: "Cosmic Radiation, its Intensity and Biological Effects." Lecturer to be announced.
Jan. 29. R.Ae.S.: "Titanium," by Maj. P. Litherland Teed, F.R.Ae.S., M.Inst.Met., M.I.M.M.
Feb. 7. Helicopter Association: Discussion on Standards of Maintenance, and Requirements for Helicopter Engineers' Licences; Papers by Members of the A.R.B. and S.L.A.E.
Feb. 9. Institute of Transport: Brancker Memorial Lecture: "The Influence of Military Aviation on Civil Air Transport," by Sir Frederick Handley Page, C.B.E.
Mar. 6. Helicopter Association: Discussion on Flight-testing Experiences: contributions by C. T. D. Hosegood, S/L. W. R. Gellatly and Capt. J. A. Cameron.
Mar. 14. The Cranfield Society: A.G.M. and Dinner.
Mar. 24-26. Institute of Metals: Annual General Meeting and (Mar. 25) All-day Symposium on "Control of Quality in the Production of Wrought Non-ferrous Metals."
Mar. 27. R.Ae.S.: Full-day Discussion on "Fatigue" (postponed from Dec. 18).

THE INDUSTRY

The Burden of Taxation

SOME forthright views on taxation are expressed in the statement of Mr. A. G. Clark, chairman of the Plessey Co., Ltd., issued to shareholders in advance of the annual general meeting on December 30th. "Taxation," he says, "has become the one problem which overshadows all others in relation to the industrial future of this country. The growth of our own company in the past was largely financed by ploughing back a large part of the profits earned, but taxation is now taking so large a share of profits that, even at the end of a successful year, so little remains to be ploughed back that expansion has to be restricted. The burden of taxation, and the necessity to formulate future plans in the light of the restricted means available to carry them into effect, tends to kill ambition and initiative and to create a sense of frustration which brings with it a general slowing down of technical progress throughout the country."

Mr. Clark's statement goes on to show that whereas the Plessey Company's consolidated profit for the current year is some £247,000 higher than last year, taxation provisions will reduce this margin to only about £30,000 nigher.

Instrument Service Abroad

FROM Smiths Aircraft Instruments, Ltd., comes news of steps which have been taken to facilitate the servicing of Smiths and Kelvin and Hughes instruments in France and North Africa, where this equipment is in service in a steadily increasing scale.

An agreement has been signed whereby complete maintenance, overhaul and repair facilities will be available at the workshops of Maroc Aviation, of 12 Rue Lecrivain, Casablanca, Morocco. This organization can deal with most makes and types of instrument, and employees have been trained in the factories of the Smith group.

Use will be made of air freight between Casablanca and centres in France in order to speed-up repairs, and Maroc Aviation are also establishing a Paris depot as a receiving and distributing centre, and to deal with minor repairs.

Under the agreement, Smiths representatives will still be available to visit users in France when any special service is called for.

Portable Electric Tools

A RANGE of Swiss-made portable electric tools that should be of interest to the aircraft industry is described and illustrated in a series of leaflets from Scintilla, Ltd., whose English company, bearing the same title, has headquarters at 20 Carlisle Road, The Hyde, London, N.W.9.

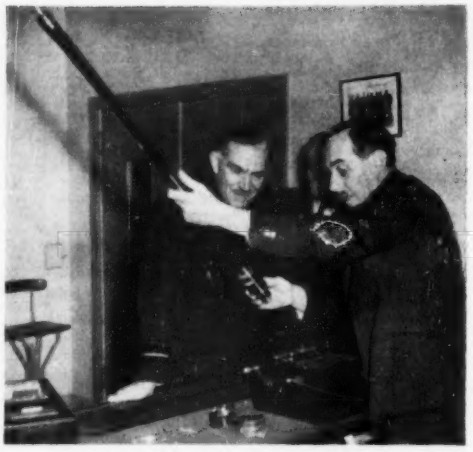
Among these "Lesto" tools listed are two types of electric shears, with cutting speeds of 5 ft min in 16 s.w.g and 3 ft 4 in min in 12 s.w.g. (weights 3 lb 4 oz and 6 lb 5 oz respectively); a nibbler (2 ft min) with universal head for cutting at any angle in relation to the body of the tool; reciprocating handsaws (for metal and wood); drills; grinders; and screwdrivers.

The saws operate at 2,300 strokes min with a 1-in stroke, are stated to have a maximum capacity of 1¼ in in wood, 5/32 in in sheet iron, and ¼ in in aluminium; weight is 5 lb 12 oz.

The various tools in the range are available in a number of operating voltages.

Jerry Shaw Joining D.H.

MR. H. SHAW—better known to the aviation world as Capt. Jerry Shaw—is to join the de Havilland Enterprise on January 1st "to undertake duties of liaison with world airline operators." On November 30th he retired from the Shell Petroleum Co. after 31 years' service. As will be recalled by those who read the appreciation of his career printed in our issue of November 21st, he had a close association with D.H. products in the pioneer airline days; and before joining Shell he did some flight testing for the then newly formed de Havilland Company at Stag Lane.



MUSEUM-PIECE: When A.V-M. R. G. Hart, C.B., C.B.E., M.C., Director-General of Engineering, Air Ministry, visited Elliott Brothers (London), Ltd., recently, he was shown a mountain thermometer made by the firm in 1858. It had been presented to the late Duke of Edinburgh by his grandmother, Victoria May Louise, Duchess of Kent, and mother of Queen Victoria. Holding the instrument is Dr. L. L. Ross, technical director and general manager.

Mr. A. E. Osborn

WE regret to learn that Mr. A. E. Osborn, director and general sales manager of Dunlop Special Products, Ltd., died suddenly in London on December 12th. Mr. Osborn, who was 57, has been in the rubber industry since he joined the Silverton Rubber Company before the First World War, during which he served as a pilot in the R.F.C. and R.A.F. In 1926 he joined Charles Macintosh, Ltd., in London and later became London manager of Dunlop's general rubber goods division.

He applied for leave to return to the R.A.F. as a ferry pilot on the outbreak of the last war, but Dunlops prevailed upon him to go to Manchester as assistant to the general manager of the rubber goods division; he was subsequently made acting general manager. He later came south to London and was appointed general sales manager of Dunlop Special Products on the formation of the company in 1946.

IN BRIEF

At the recent annual general meeting of the Junior Institution of Engineers Mr. S. R. Broderick, M.I.C.E., A.M.I.W.E., F.G.S., was elected chairman. Vice-chairmen elected are Mr. S. C. Clark and Mr. F. M. Panzetta, M.B.E., A.M.I.Mech.E., F.I.R.I.

* * *

Airspeed Precision (London), Ltd., announce that on January 1st they will be joined by Lt. Cdr. G. Dennison, from the aircraft accidents branch of the Admiralty. He will act as liaison officer from the company's London office at 22 Bruton Street, W.1.

* * *

Mr. David Brown, managing director of the companies bearing his name, was one of four British businessmen recently interviewed by the Central Office of Information for a news feature, *It's Quicker by Air*. He regularly uses his de Havilland Dove, based at the companies' private airstrip at Crosland Moor, Huddersfield.

* * *

Included in the October 1952 issue of *Welding Research* is a report, by H. E. Dixon, M.Sc., A.I.M., on *Surface Cleaning of Some Aluminium Alloys Prior to Spot Welding*. The journal is published by the British Welding Research Association, 29, Park Crescent, London, W.1.

* * *

The latest issue (No. 18) of *Wiggin Nickel Alloys* contains an illustrated article on the use of Nimonic heat-resisting alloys for the flame tubes and turbine rotor and stator blades of the Bristol Proteus. In the same issue will be found an informative article on a contrasting type of gas turbine—the Allen 1,000 kW generator unit installed in the Royal Navy's gunboat MGB 2009. Copies of the bulletin are obtainable on application to Henry Wiggin and Co., Ltd., Birmingham 16.

PSEUDOSONIC CLANGS

The Controversy Continues: Round 89

By PHISBEE Z. McGILLICUDDY, M.A., Ph.D.

WE present an important contribution from an eminent mashermatician, thoroughly familiar with Pseudosonic Flo (as she is known to friends). Formerly Scientific Adviser on Hit-and-Missile Research to the Ministry of Reduction, he is at present Deputy Assistant to the Professor of Unilateral Cosmology at the College of Aphronautics, Cranfold, and is a Master of Anatomy, a Doctor of Phisogamy, and Vice-Chairman of the Neanderthal Psychosonic Association (Surbiton branch).

WHENCE comes the pseudosonic clang? This gripping question has for many months been puzzling the best brains of Britain's aircraft industry. In the columns of *Flight*, experts such as Weights, Sporran, Funn, Hazard and Lung have contributed, postulated, integrated and differentiated—and worse—at length. If I had a criticism of their contributions, postulations, integrations and differentiations, which I have, it would be that every single word they have written is absolutely wrong, and that their conclusions, if they had any, which they have not, are utter and complete balderdash, flummery and fiddle-faddle. "One distributes along the flight-path of the aircraft a long row of balloons," they say, "but, of course, the discontinuous row of discrete balloons can be replaced by a continuous row of infinitesimal disc-like balloons." Disc-like piffle, gentlemen, which has only its seasonably decorative concept to recommend it.

And now for the real explanation. Consider a long row of aircraft, distributed along the flight-path of the balloon. Or alternatively, an aircraft commencing a quasisonic dive vertically above an observer. The sound falls vertically under gravity, but by the time it reaches ground level *there is no observer to hear the clang*, for he has tired of waiting and has gone to another dive (Maisie's place in Greek Street—clang three times and ask for Bernoulli). Then follows a period of indecision for the sound-wave (the semisonic phugoid), which then rises under Australian gravity to its previous height—but the aircraft has *gone*! The sound-wave then chases after the aircraft, but is soon dissipated (the pilot of the aircraft doesn't feel so good, either). The penultisonic dull thud may be experienced at this time.

An important but little realized phenomenon is the fact that, as the aircraft approaches the ground, the direction of flight is *downwards*. This means that with decreased altitude comes increasing proximity to ground. This difficult concept must be grasped before proceeding further to the study of clangs and the associated phenomena of ultrasonic tinkles, unisonic gurgles and kleptosonic plops.

All previous contributors have used the wrong approach to pseudosonic flow, in considering a stationary observer and a moving aircraft. Relative motion being the same, let us consider a moving observer travelling upwards through the atmosphere at sonic speed towards a stationary aircraft. Now we are left with a decrease in the number of remaining observers of 1. Is this significant? Not exactly. Unimportant perhaps, but not significant.

Difficulty has been experienced in explaining multiple clangs. It is possible that triple pseudosonic clangs may be caused by three aircraft, each making one pseudosonic clang, or indeed six aircraft, each making one semisonic smack (it will be recalled that two semisonic smacks are equivalent, from a visual point of view, to one pseudosonic clang). More likely, however, is that the triple sound heard is a combination of quasisonic dongs, infrasonic snulfs and hypersonic jumblies. Similarly, a double sound is likely to be a demisonic bleep/quadrisonic bloop combination. If this latter value is plorted against Mash number, a helisonic ssshshsh can be seen, quietly ascending on an infinitesimal balloon in the top right-hand corner, indicating stagnation at the acoustic image point.

Graphical methods can be further used with advantage. Using a five-dimensional carpet, with perpendicular axes representing altitude, temperature, air density, time and velocity, we may trace the path of a typical pseudosonic flight, in which the critical Mash number is reached eighteen times. This gives, in the altitude-time plane, the lower half of a Nicomedes' Conchoid; in the time-air density plane, a four-cusp hypocycloid; in the temperature-air density plane, a probability curve; in the altitude-velocity plane, an exponential parabola; in the time-velocity plane, a logarithmic strophoid; in the air density-velocity plane, a cycloidal lemniscate; and in the temperature-velocity plane, a straight line. This straight-line relationship between temperature and velocity, bearing in mind the properties of the standard atmosphere, proves our original assumption that, no matter what the velocity of the plane, with decreased altitude comes increasing proximity to ground, and thus there is no pseudosonic problem.

In conclusion, I wish to state that the opinions expressed in this bafflingly ingenious solution are entirely my own and would not represent those of my employers, had I any employers, which I have not. The assistance of Mr. Art Gumm in preparing the diagrams is gratefully acknowledged.

WHITWORTH SCHOLARSHIPS

SIR JOSEPH WHITWORTH (1803-1887) was one of the great mechanical engineers of the last century. His plea for the adoption of a uniform system of screw threads, the favour found by his standard gauges and his principles of exact measurement and workmanship (strictly observed in his own tool-making factory) won him wide recognition, and in the Great Exhibition of 1851 he had a show of machine tools far ahead of any other.

He gave much practical encouragement to young engineers, and his generosity was perpetuated by his residuary legatees, who, after his death, devoted over half a million pounds to charitable and educational objectives.

Today, the Minister of Education acts as Trustee of the Foundation, and in 1953 will offer the following awards: two Whitworth Senior Scholarships, tenable for two years (value £325 p.a.); five Whitworth Scholarships, tenable for three years (value £200 p.a.); and prizes of £20, not exceeding ten in number, for unsuccessful candidates for the scholarships whose work deserves recognition.

The subjects for the competition next year will be: chemical engineering plant; process steam-plant; marine or air propulsion; process control; surface finish of metals; the performance of machine tools; the purpose and equipment of engineering teaching laboratories; vibrations in mechanisms or structures; variable speed in a.c. motors; and gas turbines.

Full details of these awards and the syllabus of the examination will be found in *Regulations and Syllabus for Whitworth Scholarships*, 1953, obtainable from H.M. Stationery Office, York House, Kingsway, London, W.C.2, price 4d. (by post 5½d.), or from any bookseller.

FOR THROWING A VOICE

THERE should be useful airfield applications for a new lightweight, self-contained, electronic megaphone which has been placed on the market by the Special Products Division of the Marconi International Marine Communication Co., Ltd., Chelmsford, Essex.

The MIMCO "Jericho," as the equipment is named, is stated to give distortion-free amplification of the voice, making orders or information clearly audible, without shouting, up to distances of 500 yards or more from the speaker. The amplification is achieved without the use of valves, and the "Jericho" is powered by four small dry batteries contained in the megaphone itself, so that valve replacements, acid batteries and trailing wires are obviated.

Total weight, including batteries, is 7lb 4oz, and a pistol-grip, with a thumb-operated switch, is fitted at the point of balance.

CIVIL AVIATION

VANCOUVER-LONDON NON-STOP

PLANS for a non-stop service between Vancouver and London *via* the Arctic route were announced in Vancouver on December 18th by Mr. Grant McConachie, president of Canadian Pacific Airlines. This service, he said, would link up with other C.P.A. routes to provide the fastest non-stop services between Tokyo, Auckland and Sidney and Europe. C.P.A. are shortly due to take delivery of two Series 1A Comets, which will be used on the trans-Pacific Vancouver-Auckland-Sidney route.

A.N.A. AND THE VISCOUNT

IT was announced in Melbourne on December 16th, according to an agency message, that "Australian National Airways has cancelled an order for six Vickers Viscounts." The statement was attributed to Sir James Reid Young, chairman of Vickers-Armstrongs, Ltd., who is at present visiting Australia; reports add that it was confirmed by the managing director of A.N.A., Captain Ivan Holyman. The *Melbourne Herald* commented that A.N.A. were now interested in buying Bristol Britannias.

At the time of going to press neither Vickers-Armstrongs, Ltd., nor A.N.A. representatives in this country were able to amplify the report. The manufacturers pointed out, however, that no definite A.N.A. order for Viscounts had ever been announced, although negotiations are known to have been in progress for some time. Meanwhile, there has been no alteration in the order for six Viscounts placed by A.N.A.'s State-owned competitor, Trans-Australia Airlines. The first of these machines is due for delivery in July, 1954.

It was announced recently that, as part of the Australian Government's new civil-aviation policy, A.N.A. would be granted loans to facilitate the purchase of new aircraft. At present the airline's main equipment consists of DC-4s and DC-3s, which will obviously need to be replaced within the next few years. If, in fact, A.N.A. have decided to suspend negotiations for the purchase of Viscounts, such a decision might reflect the intention to modify the route-pattern and operate longer-range aircraft.

CHARTER NOTES

ALTHOUGH the number of miles flown by aircraft of the British independent operators (some 105,000 miles) represents a substantial increase on recent activity, this is attributed to a coincidence of long flights rather than to a Christmas rush. Activity during the previous week that ended December 14th failed to approach the level reached in November, the total mileage being about 82,700. There follow notes on charter flights during both periods.

Week ended December 14th.—Fifty flights were made, 123 involving the carriage of a total of 724 tons of freight—656 tons of it out of Berlin. Passenger flights numbered 27 and covered 11,500 miles; about 1,200 passengers were carried, all but 50 from Berlin to Hanover. Cargo was flown over a total of 71,200 miles, making the overall charter mileage for the week 82,700. The unusually high tonnage of 68 tons of freight flown on trips other than those from Berlin is accounted for jointly by Christmas parcel traffic and the short-range high-density trips across the Channel. In all, the week's work equalled approximately 237,000 freight ton-miles and 248,000 passenger-miles (about 21,000 more ton-miles).

Yorks covered some 40,500 miles; Bristol Freighters flew 26,200 miles on charter work, and Dakotas and Vikings jointly flew 16,000 miles. These operations accounted for about 475 hours in the air and netted an estimated revenue of £42,000.

Skyways of London reported that all their 29 Yorks were fully employed. Eagle Aviation made two Viking trips from Manchester to Dublin with 7 tons of Sunday newspapers. Scottish Airlines re-entered charter activity by making a Dakota flight from London to Tripoli for the Iraq Petroleum Company and flying freight in a similar aircraft from Copenhagen and Amsterdam to London for B.E.A. Air Charter sent one of their Yorks out to Singapore with 6 tons of parcel freight, stores and equipment for the Air Ministry. This company also made the usual 70 flights on the Berlin air ferries. The Air Survey Company flew six seamen and a consignment of baggage from Algiers to London. B.K.S. Aerocharter sent a Dakota to Nicosia and back with freight and passengers for the N.A.A.F.I. They also flew 5,000 lb of textiles from Manchester to Dusseldorf.

Silver City Airways Freighters flew 280 tons of freight from Berlin to Hamburg in 56 trips and 5 tons of freight each way between London and Paris for B.E.A., and continued with specialized work in East Africa. A Starways Dakota made a return flight between Liverpool and Belfast with 32 members of a football club.

LOOK—NO LEGS: Heron Series 2 is the designation of this new version of the de Havilland feederliner, which differs from its predecessors in having a retractable undercarriage. The new prototype was first flown on December 14th by George Thornton, formerly a de Havilland production test pilot but now "experimental".

Week ended December 21st.—Altogether some 157 charter flights were made—129 with freight and 29 with passengers. Almost 680 tons of freight and 1,150 passengers were carried out of Berlin by Silver City and Air Charter to Hanover and Hamburg. Some 74,000 miles were covered during freight flights and about 31,000 miles during passenger trips. The total work represented about 243,000 freight ton-miles and 984,000 passenger-miles (about 90,000 more ton-miles).

Yorks flew 49,000 miles; Dakotas, in heavy demand last week, completed 30,000 miles; and Bristol 170s covered 26,000 miles. These operations accounted for some 630 flying hours and netted an estimated revenue of £52,000.

Silver City Airways carried miscellaneous loads across the Channel, including cheese, machine tools, a de Havilland Ghost turbojet, books (12 tons), about 20 export cars—and two marble angels. From Bovingdon to Paris Silver City carried further loads, including spares for Union Aeromaritime Comets.

Skyways of London, in addition to their heavy trooping commitments, flew a York-load of Air Ministry personnel to and from Accra and returned from Bangkok with about 5 tons of animals for K.L.M. Scottish Airlines' Dakotas made a return trip with freight from Northolt to Copenhagen, *via* Amsterdam, for B.E.A., and flew out to Tripoli with freight for the Iraq Petroleum Company. Air Charter, flying from Berlin, made 23 passenger trips with 1,150 passengers and 47 freight trips with about 375 tons to Hamburg and Hanover, and returned from Singapore to Lyneham with 6 tons of freight for the Air Ministry. Meredith Air Transport sent a Dakota with freight to Khartoum for International Aeradio.

B.K.S. Aerocharter sent a Dakota from Southend to Istanbul with passengers, flew with freight to Rome, and then began a long tour of the Middle East with a retinue of United States servicemen. They flew from Rome to Rome *via* Barcelona, Madrid, Lisbon, Algiers, Castel Benito, Benina, Cairo, Jerusalem, Nicosia, Istanbul and Athens. They also started a second tour from Southend to Rome, and thence to Rome again *via* Athens, Cairo, Jerusalem, Nicosia and Athens. Another B.K.S. trip was to fly 32 members of the British section of the Austrian Alpine Club each way between Southend and Innsbruck.

COMET ACCIDENT EXPLAINED

PILOT error was the cause of the accident to B.O.A.C. Comet 1 G-ALYZ at Ciampino Airport, Rome, on October 26th, states the official M.C.A. report. The Italian authorities delegated responsibility for the enquiry to the U.K. representative, and the findings have now been published after the unusually short interval of 52 days. The accident occurred while the aircraft was taking-off on the second leg of a scheduled London-Johannesburg service; the crew of eight (including two supernumeraries under training) were unhurt, and only one of the 35 passengers was injured (very slightly).

Investigations found nothing amiss with the aircraft's documentation or loading, the licensing of the crew or the way in which their pre-flight duties were performed; neither was there any malfunctioning of the airframe or engines. It was concluded that "normal acceleration did not build up due to the progressive nose-up attitude of the aircraft which developed and which resulted in high drag and a semi-stalled condition." The accident was thus due to "an error of judgement by the captain in not appreciating the excessive nose-up attitude of the aircraft during the take-off."

The pilot, Capt. R. E. H. Foote, D.F.C., has over 5,800hr flying experience, of which 245hr were in Comets.

Runway 16 at Ciampino is tarmac-surfaced and has an uphill gradient of 1.1 per cent. Dimensions are 7,250ft by 196ft and the

Safe arrivals—The operation of modern high speed aircraft has shown the need for an omni-directional aid which will provide direct bearing information within the aircraft, exclusive of communications facilities, and a performance practically unaffected by the prevailing atmospheric conditions. Marconi V.O.R. equipment will fulfil this important requirement.

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CIVIL AVIATION . . .

pressure altitude of the airport is 400ft. At the time of the accident there was continuous slight rain; visibility was estimated as 6.2 miles by the Italian met. office and the captain's estimate was 5 miles (but with no horizon). The crew, says the report, correctly computed the take-off weight as 46,900 kg (about 1,600 lb below the maximum a.u.w. of 105,000 lb), the critical speed as 108 kt I.A.S. and the "unstick" speed as 112 kt I.A.S.

After the crew's pre-take off checks had been correctly and satisfactorily completed, the brakes were released and the aircraft made a normal acceleration. The report continues : "At 75-80 kt the nose wheel was lifted from the runway and a slight tendency to swing to starboard was corrected. At an I.A.S. of 112 kt the captain lifted the aircraft from the ground by a positive backward movement of the control column and when he considered that the aircraft had reached a safe height he called for 'undercarriage up.' At about the same instant the port wing dropped rather violently and the aircraft swung to port; the controls gave normal response and lateral level was regained. At this point the captain realised that the aircraft's speed was not building up, although he made no reference to the A.S.I. A pronounced judder was felt which he associated with the onset of a stall and in spite of two corrective movements of the control column the judder continued. Before the first officer had time to select undercarriage up, the aircraft came down on its landing wheels and bounced. It was now plainly evident to the captain that the aircraft's speed was not increasing and he was convinced that there was a considerable loss of engine thrust. He was also aware that the aircraft was rapidly approaching the end of the runway and a decision to abandon the take-off was made. The undercarriage struck a mound of earth as he was closing the throttles and the aircraft slid for some 270 yd over rough ground."

Although there was considerable spillage of fuel (from the port wing integral tanks) there was no fire; both inertia switches had tripped, the two crash-switch operating levers functioned correctly and the methyl-bromide fire-extinguisher bottles were discharged. The report quotes this passage from the B.O.A.C. Training Manual on Comet take-off technique: "At 80 kt the nose should be lifted until the rumble of the nose wheel ceases. Care should be taken not to overdo this and adopt an exaggerated tail-down attitude with a consequent poor acceleration."

The nose is lifted by a backward stick movement of about 4in, which is then reduced to 1½in to give normal fuselage incidence of 2-3 deg. "Unstick" (attitude, 6-6½ deg) is achieved by a 6in backward movement of the stick from neutral position after which it is returned towards the pre-take-off position. Manufacturers' take-off tests, the report observes, have shown that constant incidence of 6 deg during the ground run gives good results for distance run and climb-away behaviour, but an increase to 9 deg results in a partly stalled wing, giving high drag, which appreciably affects acceleration; symptoms are noticeable to the pilot as a low-frequency buffet and the aircraft recovers from this semi-stalled position if the nose is pushed well down. Fuselage incidence in the extreme case (tail bumper touching the ground) is shown in the diagram reproduced below.

The report quotes the belief of the first officer that, "the nose wheel was lifted from the ground in the usual manner although the control column appeared to be a fair way back." He also thought that the "unstick" was made by "moving the control half way back from the neutral position and that it was held there until the port wing dropped." Being unable to see the runway lights he could not determine the attitude of the aircraft after the bounce.

Publication of the report brought the following official comment from B.O.A.C. "Immediately the captain appreciated that he had made an error of judgment, he took prompt and successful action to minimize the effect . . . He is no longer flying Comets but has been transferred to York freighter aircraft [as a captain on the Singapore route]. The Comet which met with the mishap at Rome will not be repaired, but much of its equipment, i.e., chairs, instruments and interior fittings will be salvaged. The mishap was a dramatic proof of the fact that a jet airliner does not suffer a fire hazard when its fuel tanks are perforated."

AIR-CARGO PROSPECTS

"THE Future of Air Freight" was the title of an address given before the New York Society of Security Analysts on December 11th by Mr. Raymond A. Norden, president of Seaboard and Western Airlines. As an executive of one of the few non-scheduled American freight companies formed after the war and still in existence, Mr. Norden is well qualified to discuss both the past and the future of this expanding industry. In American domestic operations, he said, there were only three airlines which were certificated by the C.A.B. as non-subsidized freight carriers. From the start, these companies had been bitterly opposed by the combination "passenger-mail-express" carriers, who were unwilling and unable to render the required air freight service, but still strongly resisted the advent of any new carrier. This resistance, Mr. Norden said, continued unabated. In 1945 the American all-freight carriers flew only 1.2m ton-miles, a total which jumped to 32.8m ton-miles the following year, and which by 1951 had grown to 201m ton-miles.

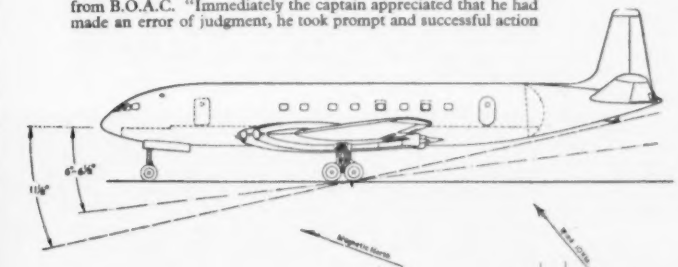
Air freight, which Mr. Norden defined as "non-mail property which moves in an aircraft devoted exclusively to the carriage of property," had accounted for 36.8 per cent of all grades of American air cargo in 1946, compared with 65.4 per cent in 1951. He attributed this increase to the introduction of specialized all-freight services and the impetus given to this new industry by the creation and productive effort of management devoted solely to one class of business. The speaker quoted C.A.A. and Lockheed forecasts showing that by 1955 U.S. domestic air freight will amount to 300-400m ton-miles and by 1960 to 1,500 ton-miles.

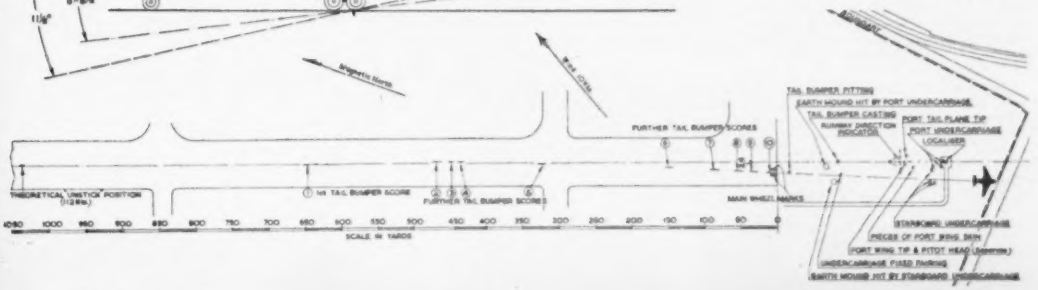
The potentialities of transatlantic freight were even greater. The only competition for aircraft were ships with speeds ranging from 11-18 m.p.h. While the actual tariff for air shipment was often higher than for surface transport, other savings tended to bring the total costs of the two methods of freighting much closer together. Surface shipment from tidewater to inland points could require up to 25 additional days caused by transport connections; other delays were caused by customs and additional handling. Insurance costs for aircraft cargoes were invariably lower. Seaboard's insurance premium rates ranged from between 10-15 cents per $100 value, whereas surface cargo rates range between 57.5 cents to $1. This reflected the absence of pilferage in air freight. Packing costs for ocean freight averaged 40 cents per cubic foot, double the average air freight packing costs.

Air freight had changed the financing, merchandising and distribution methods of various industries in which style or season played an important marketing role. In the case of soft goods, toys and novelty merchandise, speed of delivery had obviated the need for large inventories with their resultant heavy costs and high element of commercial risk.

Mr. Norden then sketched for his audience the history of Seaboard and Western, which began operations with one aircraft in May, 1947. The fleet now consisted of nine DC-4s, with four Super Constellation freighters for delivery in 1954. Over that

These drawings form appendices to the official report (referred to on pp. 796-7) on the accident to a B.O.A.C. Comet at Rome. In the sketch (left), recommended fuselage-incidence at "unstick" (6-6½ deg) is compared with the angle of incidence required (at least 11½ deg) for the tail bumper to touch the ground; the report states that "normal fuselage-incidence during the take-off ground run (between 'nose-up' and 'unstick') is about 2-3 deg." The nose is not lifted until the speed reaches 80 kt. The sequence of events is shown in the diagram (below) of Runway 16 at Ciampino.




Magnetic North
TAIL BUMPER PITTING
EARTH MOUND HIT BY PORT UNDERCARRIAGE
TAIL BUMPER CASTING
RUNWAY DIRECTION INDICATOR
PORT TAIL PLANE TIP
PORT UNDERCARRIAGE LOCALISER
FURTHER TAIL BUMPER SCORES
THEORETICAL LIMITING POSITION (11½°)
1st TAIL BUMPER SCORE
FURTHER TAIL BUMPER SCORES
MAIN WHEEL MARKS
STARBOARD UNDERCARRIAGE
PIECES OF PORT WING SKIN
PORT WING TIP & PITOT HEAD (UNDER)
UNDERCARRIAGE FIXED FAIRING
EARTH MOUND HIT BY STARBOARD UNDERCARRIAGE
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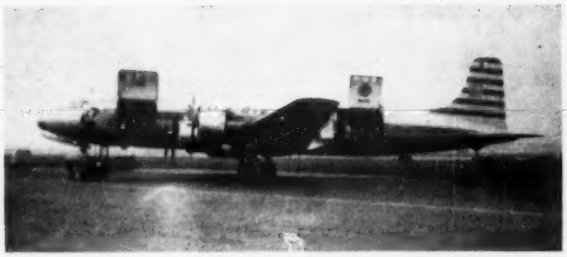
SCALE IN YARDS



FREIGHT TRAFFIC on the world's airlines has more than doubled in the past five years. Two aspects of this expanding activity are shown above by (left) Silver City Bristol Freighters unloading French cheese at Lympne after the 47-mile crossing from Le Touquet, and (right) London Airport preparations for a transatlantic flight by a Douglas DC-6A of Slick Airways. Seaboard's operations, referred to below, are carried out with Dc-4s.

CIVIL AVIATION . . .

period (in which Seaboard's aircraft had spanned the Pacific and Atlantic oceans more than 3,400 times) the capital had increased from $20,000 to $1,860,955. The profit in 1948, the first full year of business, was $11,000; in 1951 it was $702,000, and in the first nine months of 1952 Seaboard made $801,000. Noting that European airlines were responsible for carrying 63.6 per cent of all transatlantic freight in 1951, Mr. Norden attacked the Civil Aeronautics Board's philosophy of protecting the "grandfather" passenger airlines [P.A.W.A. and T.W.A.] against competition. Seaboard had applied to the C.A.B. for a certificate to fly freight without subsidy to Western Europe and the Middle East in July, 1947. In June, 1952, they received authority to fly 72 additional irregular flights monthly subject to "artificial limitations on regularity and frequency." Now, 66 months after filing the application, Seaboard were still waiting for a final decision. Mr. Norden described the attitude of the C.A.B. as the greatest and most constant barrier to the development of transatlantic air freight.

That Seaboard and Western are facing problems similar to those encountered by British independent companies is evident from the following passage in Mr. Norden's paper: ". . . Considering that the C.A.B. has made payments of over ½ billion dollars to all United States airlines since the war, it is easy to understand this paternalistic attitude. However, the Board's failure to recognize the need for an American merchant air fleet which is not truly competitive with the certificated passenger carriers has been responsible for loss of the leadership this nation [America] held in transatlantic air trade to the foreign flag carriers. Further, it has precluded the fulfilment of the national defence requirements for a large fleet of long-range, all-freight aircraft for which our military leaders constantly have expressed critical need."

Outlining the future prospects of North Atlantic freighting, the speaker said that the present lift (about 46m ton-miles annually) would continue to increase at about 25 per cent per year until Seaboard introduced its fleet of Super Constellations, which, he claimed, would be the best commercial all-freight aircraft in operation. He estimated that they would add $16m to Seaboard's operating revenue in the first full year of operations; they would each lift 18 tons across the Atlantic at 300 m.p.h. compared with 7¼ tons carried by a DC-4 at 200 m.p.h. Use of larger aircraft would generate new transatlantic cargo traffic. Mr. Norden's estimate was that traffic would increase to 160m ton-miles by 1955, and to 450m ton-miles in 1960. Still larger aircraft capable of lifting upwards of 50 tons across the ocean at direct operating costs of less than 4 cents per ton-mile would generate 1,200m ton-miles of transatlantic air freight per year.

BREVITIES

THE Republic of South Korea became, on December 11th, the 58th member-nation of I.C.A.O.

* * *

Australian, Canadian and New Zealand weather experts have been discussing at Auckland forecasting problems associated with the trans-Pacific Comet service of British Canadian Pacific Airways, which is to begin next March.

* * *

A total of 21,305,680 letters, weighing some 105 tons, have been carried during the first two years of Sabena's helicopter mail service. In 299 days of operation during the last year, there were only eight cancellations.

* * *

The German Government has awarded its Order of Merit to Mr. Juan T. Trippe, PanAm president, for "extra services to the peaceful recovery of the Federal Republic of Germany." The award was made for Mr. Trippe's part in the extension of German international trade and commercial relations with other countries.

* * *

At a recent meeting in Paris, members of the International Federation of Independent Air Transport Operators condemned the "bad example" set last March by M.C.A. when it imposed the 5s. "head tax" on passengers leaving U.K. airports. Delegates agreed that the superimposition of such taxes on existing heavy landing fees would be a brake on the expansion of traffic and delay the reduction of fares. French airport authorities have not only followed the British Government's lead but are extending an airport tax to cars and freight as well as passengers.

* * *

Eight senior engineers from the maintenance, overhaul and inspection branches of Air France's Orly base have started a two-month course at the de Havilland Service School, Hatfield. They are studying the ground engineering aspects of the Comet, in preparation for the delivery of three such machines to the French airline early next year. At the end of this month, 20 of the company's pilots, radio operators and flight engineers are expected at de Havilland's for a similar introductory course.

Blackpool (Squire's Gate) Airfield fire service has won the M.C.A. Aerodrome Fire Service Efficiency Competition for 1952.

* * *

United Air Lines' order for Convair 340s, already the largest of any operator, was increased from 50 to 55 on December 9th. To be delivered in about a year's time, the five extra machines were originally ordered by Pioneer Air Lines. United became the first company to put the new Convair into service (on its Californian routes) on November 16th.

* * *

The result of the Dail discussions (reported in *Flight* last week) on the proposed Aerlinte transatlantic service with aircraft and crews of Seaboard and Western Airlines was a 63-56 vote in favour of the plan. Two interesting points which emerged during the debate were that Aerlinte expects to lose money on the services during 1953-1954, but hopes to break even in 1955, and that the Irish company will be free to end the agreement if Seaboard do not replace DC-4s by Constellations in 1954.

* * *

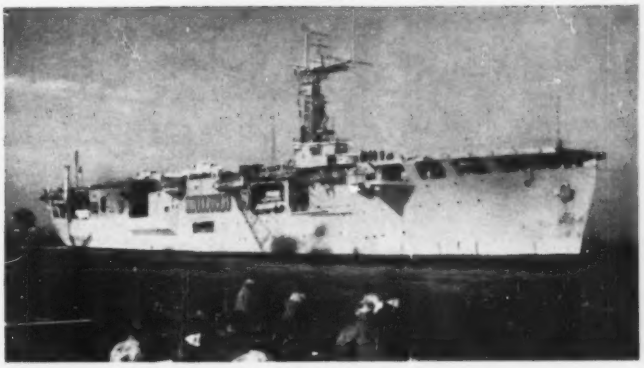
As the result of an amendment to their C.A.B. permit, Philippine Air Lines will shortly offer the first non-stop direct service between San Francisco and Mexico City. The services, to be operated twice weekly in both directions by DC-6Bs, will be an extension of the company's present international service between London and San Francisco *via* the Middle East, India, Manila and the Pacific.

* * *

Lockheed, Convair and Boeing are all making comparative studies of piston-engined, turboprop and jet transport aircraft on behalf of the U.S.A.F. General Joseph Smith, Commander of the M.A.T.S. in Washington, said recently that the U.S.A.F. will probably use these studies as a basis for their future transports. Studies began last Spring at the request of M.A.T.S., who had recommended that engineering funds be awarded to the manufacturer which produced the winning study. The requirement, said General Smith, is for a jet transport capable of carrying 15 tons of payload for 2,200 miles at 550 kt.

SERVICE AVIATION

Royal Air Force and Naval Aviation News



BACK FROM MONTE BELLO : H.M.S. "Campania" berths at Portsmouth Dockyard on returning from Australia, where she acted as headquarters ship for the atomic test at Monte Bello Island. This 20-aircraft escort carrier was originally built in 1941 to carry refrigerated cargo, and in 1951 was the Festival of Britain travelling-exhibition ship.

C.A.S. at Cranwell

THE highest wind in Britain during the gales of December 17th was recorded at Cranwell, Lincs, where the anemometer at the R.A.F. College showed gusts of up to 97 kt. This and the rain caused the graduation parade of No. 57 (General Duties) and No. 8 (Equipment and Secretarial) Entries to be held inside one of the hangars, for the first time in the history of the College. The reviewing officer was Marshal of the Royal Air Force Sir John Slessor, G.C.B., D.S.O., M.C.; he was taking his last parade as C.A.S. before leaving the active list of the R.A.F. at the end of this year.

The graduating Entry comprised 40 cadets, of whom 30 were pilots, having been presented with their wings on the previous day by Air Marshal Sir Hugh Walmsley. The reviewing officer was received by the College Commandant, A. Cdre. H. Eeles, C.B.E., and by Air Marshal L. F. Pendred, C.B.E., M.B.E., D.F.C., A.O.C-in-C. Flying Training Command.

After inspection by the C.A.S. the Cadet Wing marched past by squadrons, first in slow time and then in quick time. Although the precision of marching was high, it seemed that much was lost by the transference of the parade from its normal outdoor location in front of the College : the impression of restricted space in the hangar and the absence of the College building itself as an effective back-drop detracted noticeably, though inevitably, from the ceremony's full effect. After the march-past, Sir John Slessor presented the College's three main awards to the leading cadets of the Entry. The Sword of Honour for the best all-round G.D. cadet was received by F/Cdt. U/Off. L. R. Davis; the Queen's Medal for the highest aggregate of marks in all subjects went to F/Cdt. Sgt. D. J. Edwards; and the Medal of Honour for the best all-round E. and S. cadet to F/Cdt. U/Off. I. P. Farmer-Wright.

In his address, the reviewing officer spoke first of the responsibility which the graduating cadets would undertake as regular officers. He went on to describe the history of the R.A.F. since its foundation as an autonomous Service 34 years ago, and the manner in which its example had been followed by other countries. "Never forget," said the C.A.S., "that you are joining a Service that saved Britain in 1940, and in saving Britain saved the free world." With air power the predominant factor in war, he continued, today's *Pax Atlantica* rested on Anglo-American air power just as surely as the *Pax Britannica* rested on the British Fleet for 100 years before 1914.

Following the graduation parade, the C.A.S. planted the first tree of what is to be two avenues, eventually to flank the Junior Cadets' mess, situated across the road from the main College building.

Provost-Vampire Training

IN the House on December 17th, W/C. E. A. A. Shackleton, O.B.E. (Lab., Preston South) asked the Under-Secretary for Air when he expected to start replacing the obsolete Harvards by Vampire Trainers, and when, in consequence, he expected to be able to dispense with the advanced flying-training schools.

Mr. George Ward replied that it was hoped next year to start the first course on which pilots would be trained on Provosts and Vampire Trainers. Eventually every pilot would be trained by the Provost-Vampire sequence.

This would make it possible to dispense with all but one advanced flying school, which would be equipped with Varsities. Pilots to be employed on piston-engined aircraft would go through this school after completing their Vampire training. All other pilots would go direct to jet operational conversion units.

Mediterranean Command

IN announcing Lord Mountbatten's new appointment as C-in-C. Mediterranean, Mr. Churchill stated that Lord Mountbatten would be responsible for the security of sea communications, the co-ordination of logistic support, support of adjacent commands, mine warfare and submarine and anti-submarine operations. For all these purposes his command would include air as well as naval forces. Mr. Churchill said, however, that the U.S. 6th Fleet, including the heavy aircraft carriers, would remain under the command of Commander-in-Chief, South, Admiral Carney, U.S.N.

Helicopters for Malta

THE first three helicopters for the Mediterranean arrived at Malta on board the carrier *Perseus* on December 17th.

Perseus is on her way to Singapore carrying the ten S-55 helicopters for No. 848 Squadron, R.N. These are to be employed in Malaya as troop transports in the fight against the terrorists.

R.C.A.F. Appointment

WITH promotion to the rank of air vice-marshal, A. Cdre. J. G. Kerr, C.B.E., A.F.C., is to be A.O.C. Training Command R.C.A.F., with headquarters at Trenton, Ontario.

A. Cdre. Kerr now commands the

CRANWELL FINALE : (Left) Marshal of the Royal Air Force Sir John Slessor inspects graduating cadets of No. 57 Entry at Cranwell, in his last parade as C.A.S. (Right) Winners of the Queen's Medal, Sword of Honour and Medal of Honour respectively were (left to right) F/Cdt. Sgt. D. J. Edwards, F/Cdt. U/Off. L. R. Davis and F/Cdt. U/Off. I. P. Farmer-Wright. "Flight" photographs

"Flight" photographs

PRIZE DAY AT HALTON: (Left) Air Marshal Sir Victor E. Groom presenting the prize for the best all-round apprentice to F/S. App. A. C. Corbett. (Right) The prize winners of No. 64 Entry: F/S. App. A. C. Corbett, A/App. N. G. Simmons, A/App. J. Robertson, Cpl/App. S. R. Qureshi, Cpl/App. B. Murphy, Cpl/App. D. G. Jones, Cpl/App. R. M. Rockall and L/App. J. L. Mitchell. A report appears below.

SERVICE AVIATION . . .

Tactical Air Group at Edmonton, and in his new duties will succeed A. V-M. C. R. Slemon, the recently appointed Chief of the Canadian Air Staff. He has attended a course at the Imperial Defence College in Britain.

Airline A.T.C. Squadron

THE Air Council has approved the formation of No. 227 (B.O.A.C.) Squadron, A.T.C., whose members will be employees, or relatives of employees, of the Corporation. B.O.A.C. equipment will be made available to the unit's headquarters at Meadowbank, near London Airport.

Missing in Korea

THE Commanding Officer of No. 441 (Silver Fox) Squadron, R.C.A.F., S/L. A. R. MacKenzie, D.F.C., who left North Luffenham last month for a tour of duty in Korea with the U.S.A.F., has been posted missing. He failed to return from his second operation.

S/L. MacKenzie was a war-time pilot with No. 421 Squadron, R.C.A.F. After being posted to Air Defence Command in March, 1951, he took over No. 441, which he brought to Britain early this year to join the Canadian 1st Fighter Wing at North Luffenham.

More than a dozen R.C.A.F. pilots have served with the U.S. forces in Korea, and S/L. MacKenzie is the first casualty. The Canadians are credited with having destroyed eight Migs and scored two probables.

S/L. A. R. MacKenzie, D.F.C., C.O. of No. 441 Squadron, R.C.A.F., who, as reported above, is posted as missing in Korea.

Halton Passing-out Parade

AT the passing-out parade of the 64th Entry to No. 1 School of Technical Training the reviewing officer was Air Marshal Sir Victor E. Groom, K.B.E., C.B., D.F.C., A.O.C.-in-C. Technical Training Command; he attended in place of Lord De Lisle and Dudley, V.C., who was unable to be present.

In his report on the 64th Entry, A. Cdre. J. G. W. Weston, C.B., O.B.E., the School Commandant, first recalled the visit by H.M. the Queen to present her Colour to Halton. He went on to point out that changes in equipment had been made to enable apprentices to be taught the theory and practice necessary for them to perform their duties in a modern air force. A revision of the syllabus, he said, was being considered with the object of placing more emphasis on the teaching of fundamental knowledge and less on the teaching of details.

A. Cdre. Weston also announced the presentation of the Quinton Trophy for competition among the apprentices. This trophy takes the form of a ceremonial stick and will be awarded to the ex-A.T.C. cadet apprentice who gains the highest aggregate of marks in competition with other ex-A.T.C. cadet apprentices in his entry. The winner will receive a small replica.

(In August, 1951, F/L. Quinton was navigator of a Wellington aircraft involved in a mid-air collision. It so happened that there was but one parachute available. F/L. Quinton clipped the parachute on to the A.T.C. cadet's harness, showed him how to operate the rip cord and saw that he left the aircraft safely. The life of the cadet was saved, but F/L. Quinton died. For his courage and supreme self-sacrifice, he was awarded the George Cross, and it is in memory of him and as an inspiration to ex-A.T.C. cadets at Halton that this trophy has been presented.)

The 64th Entry started its training at Halton in January, 1950, and comprised 127 R.A.F. and 28 Royal Pakistani Air Force apprentices. Over the three years no fewer than 66 R.A.F. apprentices left the Entry, as a result of recoursing to later entries and transfers to other schools. The Entry was joined by a further 71 boys posted to it from previous entries; and of the 132 who sat for the final examination, 11 failed. Of the Pakistani apprentices, 25 of the original 28 members of the Entry completed the course.

PRIZE WINNERS

Monsignor Beauchamp Memorial Prize (best all-round apprentice), F/S. App. A. C. Corbett; Crebbin-Robinson Cup (best trade standards, practical fitting test), A/App. N. G. Simmons; Elliott Memorial Prize (highest marks in English and general studies), A/App. J. Robertson; Azhar Memorial Shield (best Pakistan apprentice), Cpl/App. S. R. Qureshi; Air Ministry Prizes: Highest in order of merit, all subjects, Cpl/App. B. Murphy; Educational Subjects (1st) Cpl/App. B.Murphy, (2nd) Cpl/App. D. G. Jones; General Service Efficiency, (1st) F/Sgt. App. A. C. Corbett, (2nd) Cpl/App. R. M. Rockall; Practical Fitting Over Three-year Course, L/App. J. L. Mitchell.

Ethiopian Visit

FOURTEEN aircraft of the Royal Ethiopian Air Force recently paid a five-day goodwill return visit to a Brigand squadron at Khormaksar, Aden. The visiting aircraft included four Fireflies and eight Saab A-17s; the Swedish director of the Ethiopian Air Force, Count Von Rosen, arrived with his family in his Bonanza.

R.A.F. Athletic Association

EXECUTIVE duties of the Combined Services Athletic Association will next year be taken over by the R.A.F.A.A.; the secretary will be W/C. A. W. Tillman (Home Command) and the treasurer, S/L. P. E. Davis (A.M. Inspectorate of Physical Fitness). The chairmanship of the R.A.F.A.A. has meanwhile been taken over by A. Cdre. H. Ford (the pole-vault and putting-the-shot athlete) in succession to A.V-M. W. J. Seward; G/C. Donald Finlay continues as deputy chairman.

The Lee-on-Solent Fly Past

IN the description of the Queen's visit to Lee-on-Solent which appeared in *Flight* of November 28th, it was stated that the fly-past was led by Rear-Admiral W. T. Couchman in a Westland-Sikorsky S-51. We are now informed that he flew a Vampire—and thus, probably, gained the distinction of being the first British admiral to fly a jet aircraft or to lead a fly-past.

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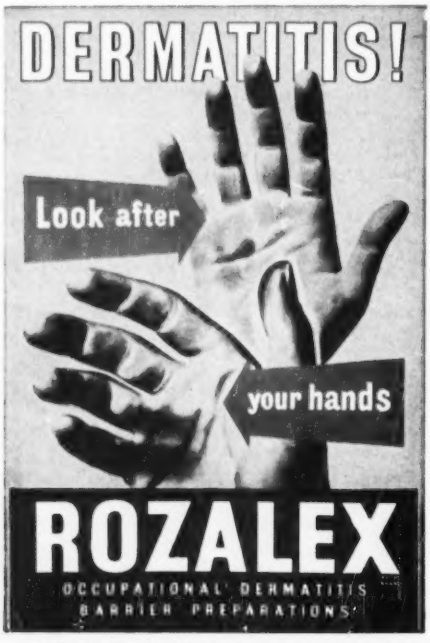

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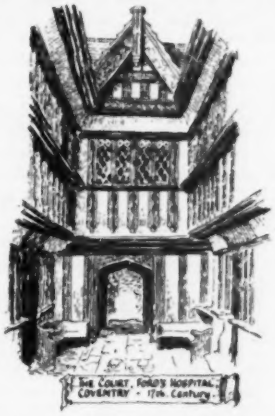

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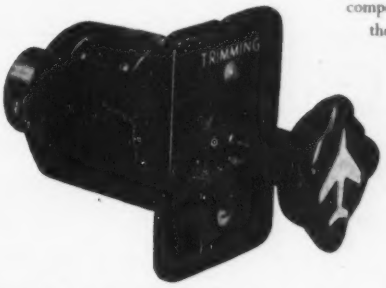

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R. K. DUNDAS, Ltd., 29, Bury Street, London, S.W.1. WHI. 2848. Cables: "Dundasaero, Piccy, London."

CROYDON AIRPORT. CRO. 7744. [0068]

WANTED, Rapide aircraft with or without C. of A.—Please furnish full particulars with lowest sale prices to Box 182, Reynells, 44 Chancery Lane, London W.C.2. [0000]

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RAPIDE spares—a large quantity kept in stock. Inquiries to Air Stores (Gatwick), Surrey. Tel.: Horley 1510, ext. 189. Night: Farnborough (Kent) 4383. [0013]

AIRCRAFT lamps and filaments, fuses, instruments, heaters, switches, relays, telephone equipment. Both British and American. Inquiries promptly attended to. SUPLEX LAMPS, Ltd., 239, High Holborn, London, W.C.1. Tel.: HOL. 0225 and 4543. [0056]

VENDAIR, Croydon Airport, advise all operators and agents requiring aircraft engine spares or ancillary equipment, British or American, to write or phone Sales Dept., Vendair, Croydon Airport. Croydon 5777. [0006]

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BROOKLANDS AVIATION, LTD., Brooklands Aerodrome, Weybridge. C. of A. overhauls, modifications and conversions. Tel.: Byfleet 436. [0005]

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REPAIRS and C. of A. overhaul for all types of aircraft. Brooklands Aviation, Ltd., Civil Repair Service, Sywell Aerodrome, Northampton. Tel.: Moulton 3218. [0307]

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A CARAVAN in a cold climate.

SURELY ex-editor caravan paper, living in van 13 years, with U.K.'s largest selection guaranteed unconditionally with free repairs and vans lent, should know the warmest vans in our horrid climate! Caravan Residents Association to help you. £25 deposit lent on h.p. terms. Free fares over 100 miles. All branches open 7 days a week. So why not write for 1 lb free brochures and advice articles to Dept. F, Taplow, please.—A. S. Jenkinson, Ltd. Equal selection—London Branch, 80 Oxford Street, W.1 (Tel.: Lanham 5606/7), 2 minutes Tottenham Court Road Tube. Bath Road, Taplow, Bucks (Tel.: Maidenhead 3434/5/6), easy to reach—right on main A.4, Taplow station 4 min. 37/39 Hammersmith Bridge Road, W.6 (Tel.: Riverside 3141), one minute Hammersmith Broadway. [0269]

NEW "Statesman." £1,065. Other Berkeleys from £399/10/-. New Glider 4-berth de luxe, £399/10/-, and 2-berth, £212. Safari, £398. Towing Hire purchase. Mantles Garages, Ltd., Biggleswade. Tel. 2123. [0267]

CLOTHING

R.A.F. and R.N. officers' uniforms purchased; large selection of R.A.F. officers' kits for sale, new and reconditioned.—Fisher's Service Outfitters, 85-88, Wellington St., Woolwich. Tel.: Woolwich 1055. [0587]

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REDHILL FLYING CLUB.

LEARN to fly at Redhill Aerodrome, Surrey, South London's nearest flying centre. 23 miles from Hyde Park Corner. £5/10/- per hour dual; from £2/10/- solo; instrument flying, instructors' and advanced courses. Attractive clubhouse with full catering facilities.—Tel.: Nutfield Ridge 2245. [0047]

HORNCHURCH and ESSEX AERO CLUB, Broxbourne Aerodrome, Nazeing, Essex. M.C.A. approved 30-hour course; solo flying from 30/- per hour; residential; trial lessons, 35/-; train from Liverpool Street, or Green Line Coach 715. Tel.: Hoddesdon 2483, 2421, 3078. [0230]

CONSULTANTS

R. W. SUTTON (CONSULTANTS), Ltd., 7, Landsdown Place, Cheltenham. Tel. 5811. [0750]

WING COMMANDER B. H. STOCKEN, F.R.Ae.S., Eagle House, 109, Jermyn St., London, S.W.1. Tel.: Whitehall 8963. [0419]

CANADA-Gt. Britain Liaison service. Technical and Sales. Personal contact.—W. P. Dunphy, Consulting Air Engineer, Montreal Airport, Montreal, Canada. [0340A]

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STANDARD STEEL HANGARS

HANGAR (all steel) 131ft overall span x 150ft to 250ft long, clear opening 119ft 6in wide x 27ft 6in high. Doors both ends (gable end optional). Covered asbestos or steel sheets. Glazing in sides.

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ROMNEY HUTS. Suitable for airfield stores or offices. Curved buildings 35ft span, covered corrugated steel sheets. Ends as required; ex-stock.

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We have a further improvement on Santa's system—**we issue stock lists,** with reference numbers, so that you can order—and duly receive—the **exact** item you need. All you need to do is to send your enquiries to us at Gatwick Airport, and the results are assured. In consideration of the prior claims of the younger generation at this time of the year, however, we must request you **not** to send enquiries up the chimney, but only by the normal postal methods.

Merry Christmas!

PUBLIC ANNOUNCEMENTS

AIR TRANSPORT ADVISORY COUNCIL

THE Air Transport Advisory Council give notice that they have received the undermentioned applications to operate scheduled air services:

FROM Cambrian Air Services, Ltd., of Cardiff Airport, Cardiff:—

APPLICATION No. 128 for a normal scheduled service with DH89 aircraft for the carriage of passengers and supplementary freight between Haverfordwest (Withybush) and Dublin (Collinstown), at an initial frequency of three services weekly, increasing according to traffic demand, during the period from date of approval for seven years.

APPLICATION No. 129 for a normal scheduled service with DH89 aircraft for the carriage of passengers and supplementary freight between Haverfordwest (Withybush) and Cork, at an initial frequency of three services weekly, increasing according to traffic demand, during the period from date of approval for seven years.

THESE applications will be considered by the Council under the terms of reference issued to them by the Minister of Civil Aviation on July 30th, 1952. Any representations or objections with regard to these applications must be made in writing, stating the reasons, and must reach the Council within 14 days of the date of this advertisement, addressed to the Secretary, Air Transport Advisory Council, 9, Buckingham Gate, London, S.W.1, from whom further details of the applications may be obtained. When an objection is made to an application by another air transport company on the grounds that they are applying to operate the route or part of route in question, their application, if not already submitted to the Council, must reach them within the period allowed for the making of representations or objections. [0057]

TIME RECORDERS

STAFF item checking and job-casting time recorders (all makes) for quick cash sale; exceptional condition.—Box 7241. [0040]

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Complete training facilities to M.C.A. application of I.C.A.O. standards, for all professional pilot/navigator qualifications on the FULL-TIME (personal coaching basis) or "STUDY-AS-YOU-WORK" (lessons, questions, model answers) method. Ideal those in Services or seeking higher licences.

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Write for advice, without obligation.

LONDON SCHOOL OF AIR NAVIGATION (1949), Ltd., 93, Ovington Square, Knightsbridge, London, S.W.3. Tel.: KENsington 6221. [0277]

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HAVE you got your Civil Pilot's Licence? NOW is the time to study, either by personal postal means or by attending at our lecture premises. Vacancies for direct tuition very limited owing to heavy bookings. Apply immediately.

WE do not have to live on an old reputation as we are building a new one day by day. Our students' successes and our methods have proved themselves the foremost in the country.

OBTAIN free details and prospectus from "AVIGATION LTD.," 30, Central Chambers, EALING, W.5 (opposite Ealing Broadway Underground Station). Tel.: Ealing 6949. [0246]

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INSTRUCTORS' COURSES
RAPIDE OR GEMINI AIRCRAFT AVAILABLE.
APPLY, Wolverhampton Aero Club, Municipal Airport, Wolverhampton.
PHONE, Fordhouses 2398. [0080]

TWIN CONVERSIONS

GEMINI aircraft, fitted radio, £6 per hour, dual or solo Southend Flying School, Essex. Rochford 54204. [0033]

AIR SERVICE TRAINING OF HAMBLE provides training in all branches of aviation in their flying, navigation, radio and engineering schools.

DETAILS of the numerous "abinitio" and conversion courses available will be forwarded on application to the Commandant, Air Service Training, Ltd., Hamble, Southampton. [0070]

AIR SERVICE TRAINING of Hamble offer a refresher course in preparation for the Commercial Pilot's Licence and Instrument Rating technical examination. Course commences February 2nd, 1953, duration 6 weeks. Fee £33.

FULL Airline Transport Pilot's Licence course commences January 19, 1953.—For particulars, apply Commandant, Air Service Training, Ltd., Hamble, Southampton. [0047]

LEARN to fly for £36; instructors' licences and instrument flying for £5 an hour; night flying £3/10/- an hour; residence 5 gns. weekly. Approved M.C.A. private pilot's licence course.—Wiltshire School of Flying, Ltd., Thruxton Aerodrome, Andover, Hants. [0253]

A.F.R.Ae.S., A.R.B.Certs., A.M.I.Mech.E., etc., on "no pass—no fee" terms; over 95% successes. For details of exams and courses in all branches of aeronautical work, navigation, mechanical eng., etc., write for 144-page handbook free. B.I.E.T. (Dept. 70D), 17, Stratford Place, London, W.1. [0707]

AERONAUTICAL, automobile or agricultural engineering. Practical full-day workshop training with graded technical courses for students with or without G.C.E. Short pre-call up or refresher courses. Syllabus from Engineer in Charge, College of Aeronautical Engineering, Sydney Street, Chelsea. Flaxman 0021. [0019]

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FREE! Brochure giving details of courses to all branches aero. eng., covering A.F.R.Ae.S., A.R.B.Certs., M.C.A. exams., etc. We are the only postal training college operated by an industrial organization. Write to E.M.I. Institutes, Postal Division, Dept. PZ6, 43, Grove Park Road, London, W.4. (Associated with H.M.V.) [0026]

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SITUATIONS VACANT

The engagement of persons answering these advertisements must be made through the local office of the Ministry of Labour and National Service, etc., if the applicant is a man aged 18-64 or a woman aged 18-59 inclusive, unless he or she or the employer is excepted from the provisions of The Notification of Vacancies Order 1952.

HER MAJESTY'S COLONIAL SERVICE

VACANCIES exist for air traffic control officers, Grade II, in Nigeria (CDE.96/14/05). Age limits 28 to 38.

QUALIFICATIONS (a) Aircraft experience preferably as pilot or navigator, and (b) successful completion of a recognised course in Air Traffic Control; and (c) actual experience as A.T.C.O. on aids watch keeping duties, preferably with experience in tropical territories.

DUTIES: Exercise of Air Traffic Control (including area approach control) at the international airports of Kano and Lagos, together with associated search and rescue and flight information service.

TERMS of appointment. On probation to the pensionable establishment with salary, according to experience, in the scale £570 to £1,230 per annum plus expatriation allowance of between £180 and £270 per annum. Outfit allowance of £60 if initial salary is below £950, £80 if above. Income tax at low local rates. Quarters are provided when available, at a rental of 10 per cent. of basic salary. Free first class passages for officer and wife once each way each tour. Special regulations for children's passages. Free medical attendance for officer and family whilst in the Colony. Vacation leave at the rate of seven days for each month of resident service.

INTENDING candidates should apply, in writing, to the Director of Recruitment (Colonial Service), Colonial Office, Sanctuary Buildings, Great Smith Street, S.W.1, giving their date of birth, qualifications and experience. They should mention this paper and quote the reference number (CDE.96/14/05). [0055

CROWN AGENTS FOR THE COLONIES

METEOROLOGICAL ASSISTANTS required by the Falkland Islands Dependencies Survey for service at Port Stanley for a tour of 30 to 36 months in the first instance. Salary in scale £246 at age 18 rising to £930 at age 28 (including foreign service allowance). In certain circumstances additional responsibility allowance of £20 is payable. Free passages. Liberal leave on full salary. Candidates must be SINGLE and should have had experience of observing and the preparation of routine climatological returns.

APPLY at once by letter, stating age, full names in block letters, and full particulars of qualifications and experience, and mentioning this paper, to the Crown Agents for the Colonies, 4 Millbank, London, S.W.1, quoting on letter M.20.18.E. The Crown Agents cannot undertake to acknowledge all applications and will communicate only with applicants selected for further consideration. [0054

VICKERS-ARMSTRONGS, Ltd. (Aircraft Section) have vacancies at their Burn depot for the following staff:—
DESIGN DRAUGHTSMEN
(aircraft experience preferable but not essential)
AIRCRAFT STRESSMEN
WEIGHTS ENGINEER
(for aircraft detail work in design office)
TRACING CHECKER
(Male or female)

APPLY, in writing, to the Employment Manager, Vickers-Armstrongs, Ltd. (Aircraft Section), Weybridge, Surrey.

APPLICATIONS, with certain exceptions, are subject to the approval of the Ministry of Labour and National Service. [0053

PILOTS

WEST AFRICAN AIRWAYS CORPORATION have vacancies for pilots to be appointed as junior captains and invite applications from pilots who hold a current Airline Transport Pilot's Licence. West African Airways Corporation have an expanding fleet of Marathon, Dove and Wayfarer aircraft.

SALARY according to qualifications and experience within the range of £1,660 per annum and £1,900 per annum.

FREE fully furnished accommodation is provided in West Africa, but married men on initial engagement may be required to serve for a few months before being joined by their families.

FREE return passages are provided each tour for the employee, his wife and up to two children, not exceeding 16 years of age.

TOURS of duty will be from 12 to 15 months with leave on full salary at the rate of one-fifth of the period of service in West Africa.

CONDITIONS of service will include membership of a pension scheme allowing retirement at 45, subject to a minimum of 10 years' service. Retirement five years earlier may be arranged by mutual agreement.) In the case of employees not completing 10 years' service, a gratuity arrangement exists whereby, subject to a minimum of four years' service, a payment at the rate of £150 for each full year of service will be made on termination of appointment.

A COMPREHENSIVE contributory medical scheme exists for employees and their families.

APPLICATIONS should be submitted to the local Agents of W.A.A.C., British Overseas Airways Corporation, Airways House (Room 105), Great West Road, Brentford, Middlesex. [0741

SILVER CITY AIRWAYS, LTD.

VACANCY exists in fully approved workshop for "A" and/or "B" licensed radio engineer.—Applications for interview, all expenses will be paid, to Manager, Blackbushe Airport, Camberley. [0800

SILVER CITY AIRWAYS, LTD.

APPLICATIONS are invited from experienced "A" and/or "C" licensed engineers for ground and flying duties; preferably, but not essentially, endorsed for Bristol 170, Hercules engines.—Write for interview, all expenses will be paid, to Manager, Blackbushe Airport, Camberley. [0856

PILOT vacancies at an early date for full instructor, com. and senior com. pilots (P.A.L./P.A. rates), and juniors for further training.

AIR NAVIGATION, Ltd., Blackpool. [0051

SITUATIONS VACANT

RADIO OFFICERS.

WEST AFRICAN AIRWAYS CORPORATION have vacancies for radio officers. Essential qualifications include possession of current M.C.A. 1st class flight radio telegraphy operator's licence.

SALARY according to qualifications and experience within the range of £1,100 per annum to £1,200 per annum (all-in).

IN lieu of benefits from a pension scheme, radio officers receive a bonus of £37.10.- for each completed three months of service.

FREE fully furnished accommodation is provided in West Africa, but married men on initial engagement may be required to serve for a few months before being joined by their families.

FREE return passages are provided each tour for the employee, his wife, and up to two children, not exceeding 16 years of age.

TOURS of duty will be from 12 to 15 months with leave on full salary at the rate of one-fifth of the period of service in West Africa.

APPLICATIONS should be submitted to the Local Agents of W.A.A.C., British Overseas Airways Corporation, Airways House (Room 105), Great West Road, Brentford, Middlesex. [0741

SENIOR airframe design draughtsman required for structural work on new aircraft.—Applications, in writing to Chief Designer, Auster Aircraft, Ltd., Rearsby, Leicester, or to local Labour Exchange. [0693

SKYWAYS, Ltd., are extending their York fleet and require additional navigating and second officers with appropriate M.C.A. licences.—Applications to the Personnel Manager, 6-7, Berkeley Street, London, W.1. [0696

LICENSED radio engineer and radio mechanics at our base at Stansted Airport, Essex. Apply by letter or telephone to the Senior Radio Engineer, Aviation Traders, Ltd., Southend Airport, Essex. Tel.: Rochford 54491. [0656

DEVELOPMENT engineer required for work in connection with aircraft pressurising and air conditioning, compressors, ducting and air-flow calculations.—Apply: Personnel Officer, Sir George Godfrey and Partners, Ltd., Hampton Road, Hanworth, Middlesex. [0066

SENIOR and intermediate design draughtsmen, with good experience of aircraft or light structural or mechanical engineering, required for aircraft and armament project work.—Apply by letter to Portsmouth Aviation Ltd., The Airport, Portsmouth. [0878

TECHNICAL illustrator required, aged 23 or over, with considerable practical experience.—Applications in writing to Personnel Manager, Percival Aircraft, Ltd., Luton Airport, Beds., stating age, experience and salary required. [0695

AIRCRAFT or mechanical draughtsmen required, all grades. Apply, stating age, experience and salary required to The Chief Draughtsman, Alan Muntz and Co., Ltd., Aircraft Division, Langley Aerodrome, Slough, Bucks. [0650

THE DE HAVILLAND AIRCRAFT Co., Ltd., Christchurch, Hants, require ratefixers (erection, fitting and machining), jig and tool draughtsmen.—Please apply stating age, and experience to the Personnel Manager. [0030

GLOSTER AIRCRAFT Co., Ltd., have vacancies for aircraft design draughtsmen and electrical draughtsmen.—Write, giving full details of previous experience, age and salary required, to Employment Officer, G.A.C., Ltd., Hucclecote, Glos. [0010

APPLICATIONS are invited from experienced airline catering officers. Preference given to persons experienced in costing control and flight equipment planning. Salary according to qualifications and experience. Pension scheme.—Apply Box 4940. [0052

JIG and tool draughtsmen, fully experienced, required by Percival Aircraft, Ltd., Luton Airport, Beds. Good working conditions and full holiday benefits, including staff pension scheme.—Applications to the Personnel Manager, stating age, experience, salary required. [0900

WESTLAND AIRCRAFT, Ltd., Yeovil, Somerset, require stressmen, junior and intermediate draughtsmen and technical writer.—Applications, stating age, experience and salary required, should be addressed to the Personnel Officer. [0065

SENIOR spares schedule clerk, capable of taking charge of compilation section, required by Percival Aircraft, Ltd., Luton Airport, Beds. Good welfare facilities, including staff pension scheme.—Applications, in writing, to Personnel Manager, stating age, experience and salary required. [0697

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H. M. HOBSON, Ltd., invite applications for positions in the drawing office as follows: designers, detail and modification draughtsmen, checkers, stressmen. The work is concerned with interesting projects connected with fuel metering equipment and hydraulic flying controls for aircraft.—Hobson Works, Fordhouses, Wolverhampton. [0630

DRAUGHTSMEN. Vacancies exist for first-class men in the production development department on the design of jigs and tools. Experience in aircraft an advantage but not essential. State experience and salary required to the Labour Manager, The Fairey Aviation Co., Ltd., Heaton Chapel, Stockport. [0049

APPLICATIONS are invited from senior and intermediate design draughtsmen. Experience of aero-engine design desirable, but not essential. Also checkers.—Please write, stating age and giving details of previous experience in chronological order, to the Personnel Officer, The de Havilland Engine Co. Ltd., Stag Lane, Edgware, Middlesex. [0930

ENGLISH ELECTRIC have vacancies for aircraft draughtsmen at Warton Aerodrome, near Blackpool. Men with good aircraft drawing office experience are invited to apply for these interesting positions which carry good salaries.—Write, giving full details, quoting reference 1208A, to Central Personnel Services, The English Electric Co., Ltd., 336-7 Strand, London, W.C.2. [0940

TEST laboratory assistants (male) required by Percival Aircraft, Ltd., Luton Airport, Beds. National Certificate standard and previous experience in design of test laboratory equipment desirable. Good welfare facilities including staff pension scheme.—Applications, stating qualifications, experience, age and salary required, to Personnel Manager. [0596

METHODS engineers, planners and jig and tool draughtsmen required for super-priority aircraft work. Superannuation scheme; excellent canteen and sports facilities. Key workers can be recommended for houses after satisfactory probation.—Write, giving full particulars, to Personnel Department, Vickers-Armstrongs, Ltd., South Marston, Nr. Swindon, Wilts. [0602

REQUIRED immediately by Percival Aircraft, Ltd., Luton Airport, Beds, several draughtsmen with comprehensive experience of engine installations and allied systems. Good welfare facilities, including staff pension scheme. Applications, in writing, giving full qualifications, experience and salary required, to the Personnel Manager. [0601

APPLICATIONS are invited from design draughtsmen and stressmen, also technical assistants with combined design and performance experience for work on both reciprocating and gas turbine aero-engines.—Applications should state full particulars of experience and qualifications and should be addressed to the Personnel Officer, The de Havilland Engine Co., Ltd., Stag Lane, Edgware, Middlesex. [0632

AIR FORCE, Naval, civil and helicopter aircraft all under design and development at Percival Aircraft, Ltd., Luton Airport, Beds. Applications are invited from senior and junior draughtsmen and stressmen, for work on this interesting programme. Good welfare facilities, including staff pension scheme.—Write, giving details of experience and salary required, to Personnel Manager. [0595

DEVELOPMENT engineers, designers, draughtsmen and modification draughtsmen, technicians, technical writers, technical illustrators, technical assistants and stressmen required for aircraft pressurising, high altitude breathing, etc.—Fully detailed applications with salary required to Personnel Officer, Normalair, Ltd., Yeovil, Somerset. Local interviews arranged where convenient. [0694

STRUCTURAL test rig designer required for detail work on test rigs by English Electric Co., Ltd., Luton. Applicants must have had several years drawing office experience preferably on similar work and have served an apprenticeship. Opportunities will be afforded to the successful applicant to take part in practical experimental work.—Please reply, quoting reference 1042B, to Central Personnel Services, The English Electric Co., Ltd., 336-7 Strand, W.C.2. [0048

STRUCTURAL test engineer, required by the English Electric Co., Ltd., Luton, to design test rigs and supervise tests on their guided weapon project. Candidates should have a degree or H.N.C. in engineering and preferably previous experience of structural test work. Knowledge of aircraft or light alloy structures an advantage, but not essential. Commencing salary according to qualifications and experience.—Please reply, quoting reference 1042A, to Central Personnel Services, The English Electric Co., Ltd., 336-7 Strand, London, W.C.2. [0034

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"MOTOR Cycle Sport in Pictures: Action Photographs of British and International Racing Trials, Scrambles and Speedway Events." Contains over sixty of the finest photographs of motor cycle sport ever taken, each picture having been specially selected by the Editor of "The Motor Cycle." A superb volume beautifully printed, which at its price represents real value. 3s. 6d. net from all booksellers. By post 3s. 9d. from Iliffe & Sons, Ltd., Dorset House, Stamford St., London, S.E.1

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(a) Senior grade with aircraft experience. (b) Intermediate grade. Preferably with aircraft experience, but applicants with light structural or mechanical experience will be considered. (c) Electrical. Aircraft experience desirable.

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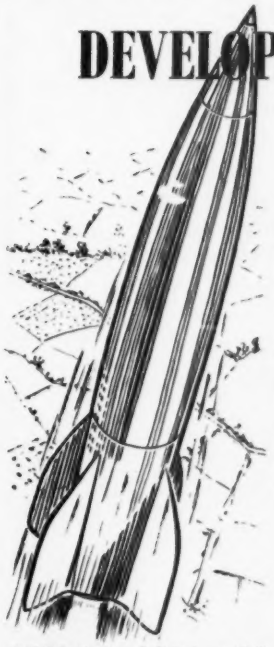

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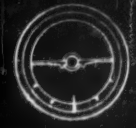

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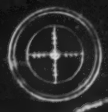

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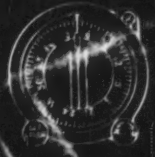

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